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Mothers' Aversion Sensitivity in the Regulation of Negative Mother-Child Interactions

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Mothers' Aversion Sensitivity in the Regulation of Negative Mother-Child Interactions

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To my husband Ofer, the most wonderful person I know.

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Mothers' Aversion Sensitivity in the Regulation of Negative Mother-Child Interactions

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Recent research suggests that aversion sensitivity—the tendency to increase negative expression rapidly as the aversive properties of children's behavior increase—may alter how mothers react to difficult child behaviors. When sensitive to, and thus distressed by children's aversive behavior, mothers may express negative emotions to children that, in turn, activate children's reciprocal negativity, leading to further negativity from the mother, and so on. Yet unknown is whether being emotionally sensitive to aversive child behaviors predicts distinct patterns of mother-child interactions. Based on predictions from emotion theory and research on coercive family interaction, this study examined whether mothers' aversion sensitivity is associated with distinct patterns of parent, child, and reciprocal negative expressions in mother-child interactions. Using longitudinal data from 319 mother-child dyads, we tested multilevel models that specified within-dyad relations between mothers' aversion sensitivity and observed patterns of mother-child emotion and behavior during interactions. From codes of mother-child conversations over time, forty-seven child behaviors were ranked from least to most aversive based on their probability of eliciting negative emotion from mothers. Using these ranks, we measured at each assessment aversion sensitivity: the rate at which the probability of a mother's expressing negative emotion increased as child behaviors went

from low to high aversive. Results supported predictions from coercion and emotion theories even when controlling for mothers' general tendencies to express negative emotion and children's tendencies to react negatively to mothers. These data demonstrate how emotions—and specifically easy activation of maternal distress— may lead to negative mother-child patterns in which mothers orient toward suppressing aversive child behavior to reduce their distress, which have been previously shown to promote children's resistance and poor adjustment. Understanding these emotional processes may help clarify the biosocial processes responsible for the adverse effects of stress, depression, and other psychosocial factors on parenting competence and child adjustment.

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Introduction

Negative reciprocity and conflictual parent-child interactions are common themes in theory and research on child socialization and family processes (Maccoby, 1992; Patterson, 1982). When pronounced, they can be powerful predictors of coercive family processes, inefficient discipline, and children's developmental problems. Why the tendency to express and reciprocate negativity is pronounced in some families is unclear. One often-mentioned possibility is that children in families with negatively reactive mothers are, in fact, more aggressive or more negative. In such cases, mothers' negative reactivity may be the result of unsuccessful discipline, which leads them to utilize increasingly negative interventions to influence children's behavior (Patterson, 1982). Another possibility is that mothers in families in which negative emotion is often expressed are more emotionally sensitive to aversive child behavior. Mothers who are emotionally sensitive or reactive to aversive child behavior may be prone to fall into negative interaction patterns. Thus, mothers' negative reactivity may reflect not only individual differences in aversive child behavior and ineffective discipline practices, but also their own emotional sensitivity to aversive child behavior. In this study I use an emotion framework to understand how emotional processes in mothers regulate negative mother-child interactions.

The Role of Emotion in Parent-Child Negative Interactions

Expressed through physiological reactions, facial and vocal expressions, and body language, emotion is a key component of negative interactions (Cacioppo & Gardner,

1999). Emotions are evolutionary mechanisms for promoting social relations and adaptive functioning. Mandler (1982) proposed that emotional arousal, whether positive or negative, is "a central process in adaptive coping with the environment" (p. 341). Demos (1986) has also noted that children can benefit from experiencing negative emotion. Because negative emotions are inevitable for humans, a developmental task for children involves learning to understand, modulate, and tolerate experiences of negative emotion. Thus, although scholars who study family relationships have long recognized the role played by negative emotion in the acceleration of negative interactions (Gottman, 1994; Patterson, 1982), negative parent-child interactions can, in fact, provide a natural dyadic context in which children learn ways to assert their needs and interests while maintaining close relationships. Furthermore, parental expression of negative emotion helps communicate to children the parents' values and goals, provides information on their social environment, and as such, can motivate children to comply with parental directives, intentions, and priorities (Dix, 1991; Eisenberg et al., 2001).

Yet expressing negative emotion can also have negative effects on children. Parents' expression of negative emotion can anger and frustrate children and motivate them to resist parents (Grusec & Goodnow, 1994; Hoffman, 1983). It can undermine children's sense of security and self-efficacy (Cummings & Davies, 1994), inhibit their autonomy (Deci, Driver, Hotchkiss, Robbins, & Wilson, 1993; Deci & Ryan, 1987), suppress their communication and initiative with parents (Shipman & Zeman, 2001), and interfere with the development of cooperative and responsive parent-child relationships (Kochanska, 1997; 2002). The question then becomes, under what conditions does negative emotion in

parent-child interactions carry a risk for maladaptive forms of parenting and parent-child interactions?

Several aspects of negative emotion may be involved in maladaptive parent-child interactions. One aspect involves reciprocal hostility and prolonged displays of anger and negative emotion. Theoretical and empirical efforts have identified reciprocation of negative emotion as an important factor in parents' emotion socialization and both parents' and children's emotion regulation and emotional behavior (Eisenberg et al., 2008). Consistent with this perspective, Lindahl and Markman (1990) proposed that children in families that have difficulty de-escalating negative emotions have difficulties recognizing and managing their own negative emotion. Researching negative reciprocity in a different context, Gottman (1994) identified negative emotion reciprocity in the interactions of poorly functioning romantic couples. Gottman (1998) concluded that the "basic sequential result that held across laboratories was that greater reciprocated negative emotional interaction is an absorbing state" (p. 179). Such an "absorbing state", Gottman argues, is resistant to change. That is, negative emotion reciprocity becomes increasingly difficult to exit and makes conflict resolution hard to achieve. Although marital relationships are in many ways different from parent-child relationships, it is likely that the experience of negative emotion reciprocity in parent-child relationships is similarly absorbing. A second aspect of negative parent-child interactions is their intensity. Steinberg and Silk (2002) claimed that the intensity of negative emotion in parent-child interactions, rather than their content, may determine their risk for children's development and their relationship with their parents. A third aspect of negative parent-child interactions is the extent to which

negative emotion occurs during discipline. The relationship between parenting and child problem behaviors is mediated by whether parents use discipline that is emotionally-controlled or emotionally-charged (Chang, Schwartz, Dodge, & McBride-Chang, 2003; Davies & Cummings, 1994; Deater-Deckard & Dodge, 1997; Eisenberg, Fabes, & Murphy, 1996). Parents who respond to children with increased negativity elicit more negative exchanges with their children and more noncompliance with parental demands (e.g., Moed et al., 2015; Montemayor, 1986).

Complementing research on negatively emotional parent-child interactions, a prominent set of proposals for why families with frequent negative exchanges place children at risk for problem behaviors falls under the rubric of coercion theory (Patterson, 1982). Coercion theory postulates that inept discipline initiates interactions that teach children repertoires of aversive behaviors. That is, behaviors that typically involve negative emotion and other intense, painful, or noxious stimulus for the parent (Lorber & Slep, 2005). According to coercion theory, the mechanism for learning such aversive behaviors is escape conditioning: Children learn to use aversive responses to terminate the aversive behaviors of parents. Patterson and his colleagues have proposed that, when parents use poor child management practices, they respond to children with inconsistent threats and demands that, in a series of escalating exchanges, elicit reciprocal negativity from children (Patterson, 1976, 1982; Patterson, Reid, & Dishion, 1992). Ultimately, mothers back down from children's resistance, reinforcing children's negativity and the mothers' tendency to give in. Although much research has suggested that negative emotion is intrinsic to these

coercive family processes, little evidence has emerged on the ways in which emotion regulates them (e.g., Granic & Patterson, 2006).

AVERSION SENSITIVITY AND PARENT-CHILD INTERACTIONS

One mechanism that may contribute to the regulation of negative parent-child interactions is parents' aversion sensitivity. Aversion sensitivity is the extent to which parents are affectively sensitive to aversive properties of children's behavior. Aversion sensitivity includes two main processes: the tendency to be aroused easily by aversive child behaviors, and the tendency to express the negative emotion that results. Triggering high arousal to children's aversive behaviors, aversion sensitivity may lead mothers to prioritize reducing that arousal over child socialization or effortful parenting. As a result, aversion-sensitive mothers may express negative emotions and display harsh parental behaviors frequently, as a means of suppressing the difficult child behaviors that aroused their distress (Dix, Moed, & Anderson, 2014). This proposal is similar to the analysis of self- versus other-oriented emotion in theories of prosocial behavior. Batson (Batson, O'Quin, Fultz, Vanderplas, & Isen, 1983), Eisenberg (Eisenberg et al., 1989), and their colleagues propose that feelings of personal distress can be expected to lead to egoistically-motivated prosocial behavior. That is, personal distress motivates individuals to relieve uncomfortable internal states by suppressing or reducing contact with the aversive, arousal-producing stimuli emerging from the other. Aversion sensitivity may be regulated by both stable and transient elements, yet unlike temperamental characteristics that are stable over time, aversion sensitivity is likely to vary across situations and can be measured on a moment-to-moment basis, similar to the measurement of emotional reactivity and emotion regulation. Any

factor that reduces the mother's threshold for tolerating aversive inputs -- daily hassles, parenting a reactive child, poor discipline practices, genetics -- may play a role in the development and persistence of aversion sensitivity (see Figure 1 for the theoretical model).

Aversion sensitivity is different from general negativity. While aversion sensitivity reflects parents' tendency to be aroused negatively by child aversive behaviors and is assumed to be impulsive, emotional, and intense, general negativity in parents reflects a different set of expressions of negative emotion. General negativity may reflect parents' personality or temperamental characteristics, personal or cultural norms about emotional expressiveness, greater commitment rules, and other factors that determine emotion generation. In the parenting literature, parents' negativity is usually measured simply as the total amount of negative emotion expressed, although post hoc discussions suggest that this negativity may reflect mothers' sensitivity to aversive child input. Only recently, however, general negativity has been distinguished from aversion sensitivity in a single study examining mothers' aversion sensitivity, their general negativity, and children's long term adjustment problems (Moed, Dix, Anderson, & Greene, 2017).

Relative to general negativity, parents' aversion sensitivity may be particularly problematic for children. It has been suggested that child aversive behaviors, behaviors that are, for example, noisy, demanding, clingy, angry, resistive, or whiny, are typically accompanied by children's negative emotion (Lorber & Slep, 2005). Because aversion sensitivity leads parents to attempt to suppress children's aversive actions and emotional expressions, children may perceive aversion sensitivity as highly controlling, autonomy

constraining, unjustifiable, and directed at them uniquely and may react to it with negativity and resistance. This should occur because aversion sensitivity does not reflect parents' justifiable interests in teaching children values, meeting children's needs, or enforcing age-appropriate expectations. Absence of correspondence between aversion sensitivity and reasonable rules of conduct may lead children, with justification, to perceive such negativity as arbitrary and unfair and to attribute it to negative intentions in parents, not to parents' understandable interest in encouraging appropriate conduct (Grusec & Goodnow, 1994). Because general negativity is less intense, less emotional, and less parent-centered, it is not as clearly resistive as children increase their demands. Parents' general negativity should thus be less likely to arouse further aversive child behaviors. Furthermore, when faced with aversion sensitivity, children may learn that the aversive properties of their own behavior elicit negativity more reliably. Children's understanding that their aversiveness will likely elicit negativity from their parent may lead to the development of pessimistic expectations. Such a cognitive-emotional process in the child is similar to learned helplessness, in which the important variable is not the occurrence of the negative event (i.e., the parent's negativity), but the perception of the relation between one's behavior and occurrence of the negative event (i.e., aversive child behavior-parent's negativity). A similar process should not occur when children are faced with parents' general negativity since the contingency between their behavior and parents' response is infrequent.

Aversion sensitivity may affect the components of extended parent-child negative exchanges that Patterson and others describe (e.g., Eisenberg et al., 1996; Patterson, 1982; Patterson et al., 1992). First, any single expression of aversive child behavior (e.g.,

whining, clinging, yelling) has the potential to become an extended exchange of negative emotion if the parent reacts to it with negative emotion. Aversion-sensitivity increases the likelihood that mothers will participate in these extended exchanges because aversive child behaviors often activate negative emotions in these mothers. Second, because aversion sensitivity benefits mothers', but not children's, immediate well-being, it is likely to elicit reciprocal negativity from children (Dix, 1991; Dix & Branca, 2003; Snyder, Stoolmiller, Wilson, & Yamamoto, 2003). Third, to the extent that the mother is aversion-sensitive, reciprocal negativity from the child should further increase her negative emotion, leading her to reciprocate yet again the child's negativity. This reciprocation may promote extended exchanges high in negative emotion. Finally, because aversion sensitivity leads to particularly high negative emotion when parents are faced with difficult child behaviors, aversion sensitivity may make mothers likely eventually to "give in" to children's demands to reduce their own distress. This terminates the difficult interaction and reinforces children's aversiveness.

AVERSION SENSITIVITY AND EXPRESSING NEGATIVE EMOTION: PREDICTIONS FROM BASIC EMOTION THEORIES

Emotion theories specify several mechanisms by which aversion sensitivity is likely to regulate negative mother-child interactions and induce negative cycles. Emotion theories imply that easy activation of negative emotion could contribute to negative parent-child interactions by altering parents' appraisals, motivations, and action tendencies (Scherer, 2001). Emotion influences behavior from simple reflexes (Lang, 1995), such as sweating and muscle contraction, to complex behavior and decision making. The

motivation to express or suppress emotion is involved in arousal (e.g., one's desire to change his or her physiological state), reward (e.g. a decision to act in a particular way in order to gain satisfaction and avoid punishment), and learning (e.g., expectation for particular outcomes based on past experience; Baumeister, Vohs, DeWall, & Zhang, 2007; March, 1978). Emotion theories might thus explain why easy activation of negative emotion should regulate negative parent-child interactions. I will examine three components of mother-child negative interactions that may be associated with mothers' aversion sensitivity: those affecting the mothers' emotion and behavior, those affecting children's emotion and behavior, and those affecting dyadic patterns of mother-child interactions.

The association of aversion sensitivity with mothers' emotion and behavior. Aversion sensitivity should increase mothers' experience and expression of negative emotions. Theories of emotion suggest that activation of emotion has important implications for parent-child interactions (Dix, 1991). Activation processes determine what emotion will occur and when. Emotional activation also determines the intensity with which the emotion is experienced (e.g., Baumeister et al., 2007). Because negative emotion activation is thought to occur more frequently when aversion sensitivity is high, aversion sensitivity may make mothers prone to frequent emotions that can promote negative evaluations of children and lead mothers to select emotion-consistent but ineffective parental responses, such as harshness and hostility. When emotions are aroused, they prime action-preparation, reaction tendencies, and behavioral choices that bias parental behaviors (Eder, Pfister, Dignath, & Hommel, in press; Frijda & Parrot, 2011; Lang, Bradley, &

Cuthbert, 1990; Lang, 1995) and promote expression of negative emotions. Frijda (1986) described action preparation as a "felt mode of action readiness" (p. 238). Once activated, intense emotions (brought on by the aversiveness of the child) are also likely to determine the intensity of the parent's response (Avero & Calvo, 1999). Behavior that reflects arousal and negative emotion is impulsive and undermines an individual's careful examination of how best to pursue long-term, rational goals (Leith & Baumeister, 1996). Highly aroused, a mother may become unable or unwilling to restrain her immediate negative impulse in favor of what in the long run will be most beneficial for the child and the mother-child relationship. Furthermore, distress shifts priorities toward immediate reduction of aversive inputs (Tice, Bratslavsky, & Baumeister, 2001). By arousing feelings of distress, aversion sensitivity may lead the mother to perceive her child's aversiveness as an obstacle to her well-being, and her immediate goal may become the reduction of her distress. To achieve her goal, she may react to immediately suppress her child's difficult behavior. Although the tendency to suppress children's difficult behaviors is present to some degree in all mothers, aversion sensitivity may increase this tendency.

The idea that aversion sensitivity leads to emotions that arouse, prepare, and organize emotion-consistent response tendencies (i.e., that align with mothers' level of experienced negative emotion), along with the notion that negative emotions are typically highly aversive (Watson & Clark, 1984), lead to two hypotheses about how aversion sensitivity may influence maternal behavior:

Hypothesis 1: ***During mother-child interactions, aversion sensitivity will predict a high level of maternal aversiveness (i.e., maternal behaviors that are aversive to the child)***.

Hypothesis 2: ***During mother-child interactions, aversion sensitivity will predict high likelihood that mothers will reciprocate children's initial expression of negative emotion***.

Given that emotions are often fleeting and triggered by transient and fluctuating changes in children's aversive behaviors, aversion sensitivity is likely to be associated with mothers' emotional variability. Emotional variability is often represented by the within person standard deviation of an emotion over time (e.g., Eid & Diener, 1999) and reflects how much people's emotional experiences deviate from their average emotion. It has long been suggested that emotional variability is related to the experience of frequent and intense negative emotions (Larsen, 1987). Furthermore, more than four decades ago Bem and Allen (1974) suggested that the emotionally-variable person may be variable precisely because he or she is responsive to situational cues and contingencies. Many studies have since supported these contentions, and emotion-related correlates of emotional variability such as depression (McConville & Cooper, 1996; Hall, Sing, & Romanowski, 1991), neuroticism (Murray, Allen, & Trinder, 2002), and bipolar disorder (Knowles et al., 2007) have been well established. During negative mother-child interactions, emotional variability is thought to be determined by sensitivity to changing emotional elicitors from the child. Given that aversion sensitivity is associated with mothers' high reactivity to even

modest moment-to-moment changes in children's aversiveness, I propose a third hypothesis:

Hypothesis 3: ***During mother-child interactions, greater aversion sensitivity will predict higher variability in the aversiveness of mothers' behaviors***.

If acting to suppress children's aversive behavior fails to reduce mothers' distress, aversion-sensitive mothers may adopt a less assertive course. Specifically, if the mother's aversion-sensitive response does not yield the compliance she desires from her child, her distress is likely to increase. Because children's continued negative reciprocity undermines mothers' goal of reducing their distress, it is likely to elicit further negative emotion (Frijda, 1986). Increases in negative emotion inhibit people from considering the emotional consequences of subsequent actions (Wegener & Petty, 1994). Thus, although it increases the mother's desire to reduce the distress she is experiencing, aversion sensitivity, in fact, may make the mother's immediate negative response to her child's aversiveness prolonged and increase her distress. When, due to the child's reciprocal negativity, aversion sensitivity fails to reduce the mother's negative emotion, withdrawing from the negative cycle may be a useful short-term strategy for terminating the distressing interaction (Baumeister et al., 2007; Patterson, 1982).

Indeed, this withdrawal tendency follows from emotion theory. Negatively aroused and highly distressed from exposure to aversive child behaviors, mothers may attempt to end their distress by withdrawing from the negative cycle. Emotion prepares action by helping one assess resources when planning or choosing actions. Arousal helps individuals assess their state of readiness for action or energy expenditure. In the midst of negative

reciprocity, the prolonged negative valence and high arousal that characterize aversion sensitivity may affect a mother's evaluations of her competencies and efficacy in regulating her child's aversiveness. When aversive child behavior is persistent, the elevated levels of negative emotions experienced as a result of aversion sensitivity may lead a mother to withdraw from the increasingly emotionally demanding, negative cycle. This leads to a fourth hypothesis:

Hypothesis 4: ***Aversion sensitivity will be positively associated with the likelihood that mothers eventually "give in" or end negative reciprocity with their children (i.e., mother-ended negative reciprocity).***

The association of aversion sensitivity with children's emotion and behavior. Theories of emotion can explain why mothers' aversion sensitivity may also influence children's behavior. Emotions have evolved as forms of communication to partners and other organisms. Theories of emotion (Van Kleef, 2009; Van Kleef, De Dreu, & Manstead, 2010) postulate that people express emotions in order to communicate their evaluation of events and state of action readiness. Partners use this information as input to their behavioral decisions. The behavior of children exposed to aversion-sensitive mothers may thus be linked to the expressed negative emotion associated with aversion sensitivity. The emotional characteristics of mothers' aversion sensitivity imply that children must coordinate their behavior with an interaction partner who is volatile, who is less likely than other mothers to promote children's goals and concerns, and who is more likely to use emotional strategies that fail to achieve harmonious parent-child interactions.

When pondering whether to cooperate with parents, children implicitly or explicitly use parents' emotions to inform their behavior (see Van Kleef et al., 2010). Because aversion sensitivity leads to impulsive and parent-oriented behavior, children may perceive it to be arbitrary, inappropriate, and unfair. Such perceptions may activate children's anger and difficulty regulating their negative emotion. Snyder et al. (2003) showed that similar maternal negativity - angry, contemptuous, and dismissive parental responses to a child's anger - was related to shorter latencies to the next anger display by the child. In other words, parent-oriented anger increased the likelihood that the child would reciprocate with anger. Similarly, Eisenberg and her colleagues (Eisenberg et al., 1999) showed that lack of emotional regulation by parents affects the child's ability to regulate his or her emotions and may lead to a negative response from the child. When mothers' aversion sensitivity is high, this, in turn, should elicit reciprocally negative responses frequently. This cycle may be repeated again and again. Yet, because a principal characteristic of aversion sensitivity is reactions to specific child stimuli, when no child stimuli is linked to the mother's expressed emotion, children's level of aversiveness may not be associated with mothers' aversion sensitivity. These considerations lead to the following fifth hypothesis:

Hypothesis 5: ***At the beginning of an interaction, when insufficient time has elapsed for aversion sensitivity to be expressed, children's aversiveness will not differ as a function of their mothers' aversion sensitivity for that specific interaction (child aversiveness intercept). Aversion sensitivity will, however, predict increases in children's aversiveness as the interaction progresses (children's aversiveness slope across the interaction).***

Just as mothers' emotional variability is related to the experience of frequent and intense negative emotions, children's emotional variability should also relate to their experience of negative emotions. First, due to aversion-sensitive mothers' reactive and inconsistent emotional responses, children may perceive them as unpredictable and thus react strongly and promptly to negative emotional inputs from them. Second, High variability in children indicates frequent emotional changes that may be the result of failure to constantly regulate the emotions that arise as a result of their mothers' aversion sensitivity. When negative emotion is a persistent characteristic of parent-child interactions, the demand that children regulate their emotions may be sufficiently frequent that it eventually depletes children's emotional resources needed to maintain equilibrium across negative interactions. Children's sensitivity to mothers' aversion sensitivity may thus be reflected in children's tendencies to react frequently to mothers' volatile emotional expressions, increasing their own emotional and behavioral variability. This leads to my sixth hypothesis:

Hypothesis 6: ***Aversion sensitivity will predict high variability in the aversiveness of children's behavior***.

The association of aversion sensitivity with dyadic patterns of mother-child interactions. The effects of aversion sensitivity on dyadic indices of mother-child interactions can also be explained theories of emotion. By increasing children's reciprocal negativity, mothers' aversion sensitivity may contribute to a particularly problematic pattern of mother-child interaction: Extended negative exchanges. A cornerstone of coercion theory (Dishion & Patterson, 2006; Patterson, 1982; 2002), these are interactions

in which children and parents become increasingly aversive as difficult interactions proceed. This should be likely to occur when children perceive maternal negativity as highly impulsive, intense, emotional, arbitrary and unfair. Negatively aroused by children's aversiveness, aversion sensitivity should lead mothers to accelerate their own negativity with actions that have high arousal properties, further activating children's negativity, which should increase mothers' negativity, and so on. Extended exchanges should be frequent to the extent that mothers respond with increasing negativity the more aversive children's behavior becomes. This leads to two final two hypotheses:

Hypothesis 7: ***Aversion sensitivity will predict relatively frequent mother-child negative emotion reciprocity.***

Hypothesis 8: ***Aversion sensitivity will predict relatively long mother-child negative emotion reciprocity***.

Method

PARTICIPANTS

Participants were 319 divorcing mothers and their children from a metropolitan area in the south-central U.S. who were part of a larger longitudinal study of repartnering after divorce. Boys and girls were represented about equally (52% female). At the baseline assessment children ranged in age from 4 to 9 years (M = 7.77, SD = 2.0); mothers' age ranged from 21 to 53 years (median = 36.8). Sixty-four of mothers were Non-Hispanic White, 27% were Hispanic, and 9% were African American. Mothers' education ranged from less than a high school degree (9.4%) to a graduate degree (1.3%); two years of college was the median. 82% of mothers were employed at least part time. Prior to filing

for divorce, the median family income was $50,000.

PROCEDURE

Addresses of prospective participants were obtained from divorce court records. They were sent pamphlets containing information about the study. Phone calls were made shortly after to verify eligibility. If eligibility was confirmed, participants were asked about a possible visit to their house where they could become familiar with the study and answer questions concerning their participation. Of participants who agreed to the first visit at their house, 88% agreed to participate in the study.

Overview. A baseline assessment was completed within 120 days of filing for divorce. Follow-up assessments were completed at 12 and 24 months. Additional assessments were done in cases of significant changes for the mother in terms of dating and relationships (e.g., cohabitation, engagement, remarriage). If no such changes occurred, mothers' additional assessments were obtained at 6-months and 18-months. At each home-visit assessment, mothers completed a set of questionnaires and a 12-minute mother-child interaction was recorded. By design, dyads in the present study varied in the number of assessments they completed, as well as the time intervals between the assessments. 19% of participants completed four to six assessments, 58% completed three assessments, 12% completed two assessments, and 11% completed only the baseline assessment. All 919 available assessments were used in the present study.

Interaction task. At each assessment, each mother and her target child discussed up to 4 areas which the mother listed earlier as current topics of disagreement and concern. In order to maintain the integrity of the research, trained interviewers conducting the in-home

procedure were asked to rotate the order in which the families talked about disagreements and concerns (i.e., the first dyad interviewed was asked to talk about disagreements first and concerns second; the second dyad interviewed was instructed to talk about concerns first and disagreements second). Each mother and her target child were seated on two hardback chairs angled slightly ("knee to knee"), about 8-10 feet from the camera, in order to ensure a full body shot. Once the camera started recording, the interviewer provided the mother and the target child the following instructions: *"OK, it looks like we are ready to go. Disagreements and concerns are a common part of all family life. Some families tell us that we can learn about disagreements and concerns by observing families as they discuss them. Listed on this form [SHOW THEM THE MOTHER+CHILD CONVERSATION FORM] are two disagreements and two concerns that you family may be experiencing. We'll leave the room and would like you to discuss each issue, in turn. Talk about how each issue comes up, who gets involved, how the situation usually ends, and ways to handle the situation differently in the future. We've listed the issues on the form here for you to have [HAND FORM TO FAMILY]. Remember to try to cover each issue and the four areas of discussion, if possible. If you finish before the 12 minutes are up, remain seated and talk about anything you want to discuss. Only our researchers will view this tape, of course, so it is confidential. We'll see you in 12 minutes".* Interactions were videotaped using a single camera and were later coded using the Family and Peer Process Code (FPPC; Stubbs, Crosby, Forgatch, & Capaldi, 1998).

The FPPC is an utterance-based code that enables each turn to be identified with a content and an affect code. The FPPC consists of 24 content codes (e.g., advise, command,

coerce, agree, refuse, physical aggression; see Appendix A) and six affect codes (happy, caring, neutral, distressed, hostile[1], sad). Utterances were uniquely identified by speaker (mother or child), content, and affect, and were tabulated in sequential order. Content and affect codes for each utterance were identified solely by their presence (i.e., intensity scores for detected content and affect were not coded), and were determined independently for each utterance. Because a new code was assigned whenever either the speaker, content, or affect changed, a speaker—if either the content or affect of that speaker's changed—could follow himself or herself with a new turn without an intervening turn by the partner. Consequently, to create distinct alternating single talk turns, I selected the most negative content and affect that occurred during a sequence of utterances to represent the speaker's code for that turn. Inter-rater reliability for the FPPC codes were determined from a sample of 20% of all recorded observations. The average kappa was very good, .80, with 85% of kappas above .70; 91% above .60; 96% above .5.

DATA PREPERATION

Determining the aversiveness of children's behavior. Each of the six affect codes was combined with each of the 24 content codes to generate 144 child behaviors. To ensure adequate data for each child behavior, behaviors with base-rates below the median of 28 occurrences were eliminated. This eliminated less than 1.6% of talk turns and yielded 47 usable child behaviors (see Table 1). The data included 170,357 talk turns from 919

[1] The hostile affect code appears in the original code book as aversive affect code. For clarity purposes, however, I use the term 'hostile' to describe this code in order to avoid confusion with the aversiveness terminology used in this paper.

interactions, an average of 187 talk turns per interaction. Child behaviors were ranked from least to most aversive based on the probability that, across the entire sample, mothers expressed negative affect (hostile or distressed) in the next turn (sadness was excluded because often it is unresponsive to immediate inputs and linked less to signals about the impact of partners' immediate actions; Frijda, 1986; Horstmann, 2003). Figure 2 displays this relation across the entire sample, together with an illustration of an individual mother's probability of reacting with negative affect as a function of the aversiveness of her child's behavior. It is important to note, however, that the extent to which a child's behavior is aversive is subjective and may vary from one mother to another. That is, a behavior that is highly aversive to one mother may only be slightly aversive to another mother. The determination of the extent to which different child behaviors in this study were aversive to mothers was based on the entire sample. Thus, due to the subjective nature of mothers' interpretations of children's behaviors, some variability in the extent to which these behaviors are aversive is likely attributable to mothers' own perceptions. As I will describe in the Measures section, the aversiveness of children's behavior was later used as the foundation for creating the following variables: mother's aversion sensitivity, child aversiveness intercept and slope, and child aversiveness variability.

Determining the presence of parent-child negative emotion reciprocity. In order to determine if negative emotion was reciprocated, I examined sequentially the affect coded for each talk-turn in each 12-minute interaction. As examined by others (Maynard, 1985; Moed et al., 2015), negative reciprocity requires that an initial negative expression from one person be met with a negative expression by the other person. If a negative response

to an initiation occurs, then the initial negative instance retrospectively marks the beginning of the negative reciprocity episode. As such, in the present study, the beginning of negative reciprocity was defined as an instance in which one participant's neutral or positive affect was immediately followed with negative affect from the other participant. However, in order for negative reciprocity to occur, this initial negative affect had to also be followed immediately with negative affect from the other participant. In other words, a chain of at least two consecutive negative affect codes (hostile or distressed) following neutral or positive codes were marked as an episode of negative reciprocity. Only hostile and distressed affect codes were used to determine the presence of negative emotion reciprocity (i.e., sadness was the only negative affect code excluded) because hostility and distress reflect immediate reactivity to negative inputs, while sadness often reflects a response to less immediate inputs and linked less to signals about the impact of others' immediate actions. Negative emotion reciprocity was defined as continuing until one participant was observed to no longer express negative affect (i.e., received a code of positive or neutral affect). This participant was then identified as the one who ended the negative reciprocity. If this partner was observed to express negative affect on a subsequent code, this was marked as the beginning of a new episode of negative reciprocity, if it was reciprocated by the other partner. As I will describe in the Measures section, mother-child negative emotion reciprocity was later used as the foundation for creating the following variables: probability of mother reciprocating child's initial expression of negative emotion, probability of mother ending negative reciprocity, number of negative emotion reciprocities, and length of negative emotion reciprocity.

MEASURES

Independent Variable

Mother's aversion sensitivity. As Figure 2 illustrates, my analytic procedure allowed me to obtain at each assessment individual slopes of mothers' negative emotional reactions across increases in the aversiveness of children's behavior. Note that computation of these slopes was based, not on changes in maternal negative expression across time, but rather on changes across aversive child behaviors at each point in time; slopes reflected the rate of increase in a mother's expression of negative affect as the 47 child behaviors went from low- to high-aversive. At each assessment, intercepts and slopes for each mother were calculated by regressing mothers' true probability of reacting with negative affect to each child behavior on mothers' expected probability of reacting with negative affect to each child behavior (the expected probability for the overall sample). Because intercepts did not reflect variations due to changes in aversive child behaviors, they were not interpreted. At each assessment, then, mothers' aversion sensitivity was the rate at which the probability of mothers expressing negative emotion increased with increases in the aversiveness of children's immediately preceding behavior (i.e., the slope across the 47 child behaviors as they increased from low- to high-aversive). The validity of this measure is evident in its relation to mothers' depressive symptoms and children's adjustment problems (Dix et al., 2014; Moed et al., 2017).

Dependent Variables

Mother's average aversiveness. Similar to the calculation of aversive child behaviors, mothers' possible 144 behaviors were examined (a combination of 6 affect

codes and 24 content codes). Out of these 144 possible mothers' behavior, 50 behaviors with base-rates above the median of 28 occurrences were included. All 50 maternal behaviors were ranked from least to most aversive to children based on their probability of eliciting negative affect from children, with 1 being least aversive and 50 being most aversive (see Table 2). Mothers' aversiveness was the mean aversiveness ranking of all maternal behaviors that occurred throughout each 12-minute interaction.

Probability of mother reciprocating child's initial expression of negative emotion. For each mother-child interaction, a mother's probability of negative reciprocation was the proportion of child's initial expressions of negative emotion (i.e., the mother was either neutral or positive in the preceding interval) to which the mother immediately responded with negative emotion. This can also be considered the proportion of child-started negative reciprocities. Yet, what turned it into a negative reciprocity is the mother's negative emotional response to the initial negative expression of the child.

Mother's aversiveness variability. For each 12-minute interaction, the variability of mothers' aversiveness was calculated as the standard deviation of the mother's aversiveness throughout the interaction. Appendix C shows a graph exemplifying a mother's and a child's aversiveness ranking throughout an interaction. The mother's aversiveness variability was computed based on the variations shown in this graph.

Probability of mother ending negative reciprocity. All negative reciprocities identified for each dyad were categorized as either mother-ended or child-ended. The probability of the mother ending the negative reciprocity was the proportion of all negative reciprocities for which the last interval in the negative reciprocity was negative affect

expressed by the child, to which the mother responded with either neutral or positive affect.

Child aversiveness intercept and slope. The child's aversiveness intercept is the child's initial level of aversiveness in the interaction. In other words, for each 12-minute interaction, this is the level of aversiveness represented by the intercept from regressing aversive child behaviors on talk turns. The slope from this regression is the average rate of change in aversive child behaviors across a 12-minute interaction. That is, each child's aversiveness slope reflects whether the aversiveness of the child's behavior increases, decreases, or stays the same as the interaction progresses. Figure 3 illustrates child aversiveness intercept and slope using example data of aversiveness ranking of child behaviors throughout an interaction.

It is important to highlight the difference in the computation of these intercepts and slopes from the computation of mothers' aversion sensitivity intercepts and slopes (i.e., those presented on Figure 2, which has the 47 child behaviors on the x-axis and the probability of mothers expressing negative affect on the y-axis). Children's aversiveness intercepts represent the aversiveness ranking of children's behaviors (see Figure 3; the y-axis variable) at the very beginning of the interaction; children's aversiveness slopes represent the rate of change in the aversiveness ranking of children's behaviors as the interaction progresses (i.e., the x-axis represents talk turns).

Child aversiveness variability. For each 12-minute interaction, the variability of child's aversiveness was calculated as the standard deviation of the child's aversiveness throughout the interaction. Appendix C shows a graph exemplifying a mother's and a child's aversiveness ranking throughout an interaction. The child's aversiveness variability

was computed based on the variations shown in this graph.

Number of negative emotion reciprocities. The number of negative reciprocities a dyad had was defined as the number of talk-turn chains in which the mother and the child consecutively exchanged negative affect in a single 12-minute interaction. That is, in order for negative reciprocity to occur, and thus to be counted, an expression of negative affect by one dyad member had to be followed immediately by an expression of negative affect from the other dyad member. At least two consecutive exchanges of negative affect had to be expressed to constitute negative reciprocity.

Length of negative emotion reciprocity. For each negative emotion reciprocity identified, I counted the number of consecutive talk turns in which negative affect was expressed (i.e., the number of talk turns that form the negative reciprocity episode). A dyad's length of negative reciprocity is the average number of talk turns across all negative reciprocities a dyad had in a single 12-minutes interaction.

Control Variables

In all analyses, four demographic variables were examined as possible controls: child age, child sex, mother age, and mother employment. Control variables in the present analyses were included on the basis of their potential to be confounders, to affect the generalizability of the results, and to affect the ability to draw proper conclusions. The mother's age was used as a control variables because the older the mother is, the more she interacts with her child in a positive and sensitive manner (Belsky, 1984; Chase-Lansdale & Pittman, 2002). The mother's employment status was added as a control variable on the basis of past research showing that the stresses associated with mothers' employment affect

their emotion and interactions with their children (Roehling, Hernandez Jarvis, & Swope, 2005). Associations between the control variables and each of the dependent variables are presented in Tables 4, 5, and 6.

In addition, intercepts calculated for the slopes representing mothers' aversion sensitivity were controlled in all models involving mothers' aversion sensitivity. To rule out the possibility that mothers' general negativity or children's negative reactivity might account for the relations between aversion sensitivity and the interaction patterns examined, mothers' general negativity and children's negative reactivity were controlled in all analysis. I chose to control for children's negative reactivity because it is the child characteristic most relevant to mothers' expressions of negative emotion. Theoretically, conceptions of aversion sensitivity imply that mothers regulate their expressions of emotion as a means of producing interactions that minimize their easily-aroused negative affect, which involves anticipating children's reaction to that expression (e.g., if the child is expected to resist, more forceful expression may be necessary). Thus, my intent was to ensure that mothers' aversion sensitivity was a principal predictor of each outcome independent of child negative reactivity, a characteristic of children that might inflate observed relations between mothers' aversion sensitivity and mothers' and children's emotion and behavior.

Children's negative reactivity. Children's negative reactivity is the proportion of mothers' expressions of negative affect to which children responded with negative affect during the next talk turn.

Mothers' general negativity. A mother's general negativity was the number of talk turns in which she expressed negative affect (received an affect code indicating either hostility or distress; regardless of the preceding child behavior) out of the total number of talk turns she had in the interaction (i.e., percentage of negative talk turns).

Analysis

Multilevel models were used to examine these repeated measures data. All multilevel models were conducted using Mplus version 7.4. As Singer and Willett (2003) stress, multilevel models such as those examined here can accommodate large variations in the number and spacing of observations across participants. Models assessed outcomes predicted by mothers' aversion sensitivity and the two control variables, children's negative reactivity and mothers' general negativity. Full-information maximum-likelihood estimation was used to handle missing data. The multilevel models used to test predictions of outcomes are 2-level models. Level-1 includes within-dyad variables that describe the interaction. Level-2 serves to cluster the interactions by dyad.

Results

Means and correlations related to key variables are presented in Table 3. These values represent all dyads across all assessments (i.e., the entire person-period data set). By design the data are unbalanced and thus the timing and number of evaluations varies across subjects. This is not problematic for the multilevel models that are the basis of my analyses, but it does mean that standard deviations and significance levels cannot be meaningfully calculated for the bivariate correlations (Singer & Willett, 2003). The correlations themselves, however, are unbiased estimates of population parameters.

There are two anomalies in Table 3 that are important to address. First is the finding of a negative correlation coefficient between children's aversiveness intercept and children's aversiveness slope. This is, however, not surprising as intercepts and slopes are often negatively correlated, indicating a possible ceiling effect (a higher initial level commonly associated with a less steep slope; e.g., Kaplan, 2009). The second anomaly is the low mean proportion of mother ending negative reciprocity. Proportions of mother-ended negative reciprocities were computed for each of the 919 interactions. For each interaction that had negative reciprocity, mother-ended negative reciprocity and child-ended negative reciprocity added to 100%. However, the mean proportion reported for mother ending negative reciprocity in Table 3 (an average proportion of 0.10) is smaller than if this proportion was computed using only interactions in which negative reciprocity occurred (161 interactions; 114 dyads). The average proportion of mother-ended negative reciprocity would have been 0.57 if it was computed using only interactions in which negative reciprocity occurred. In interactions in which no negative reciprocity occurred, the proportion of mother-ended negative reciprocity was zero, and these zeros pulled down the average of the variable. When the proportions within each interaction were examined, the proportions of mother-ended negative reciprocity and child-ended negative reciprocity did add up to 100%.

Given evidence that children's aversive behaviors often involve negative emotion (Lorber & Slep, 2005), and expressions of negative emotion are aversive to mothers (Gudmundson & Leerkes, 2012), I explored whether mothers' aversion sensitivity might reflect in part their reactivity to children's negative emotion. This idea was supported. Of

the 47 child behaviors, the mean aversiveness rank for those that included children's expression of negative emotion was 38.67; the mean for those that did not was 17.13, $t(45) = 7.39$, $p < .001$.

Finally, results from the nine multilevel models are presented in Tables 4, 5, and 6, and described below.

Mothers' emotion and behavior during mother-child interactions. Table 4 presents results from four multilevel models examining mothers' aversion sensitivity, mothers' general negativity, and children's negative reactivity as predictors of each of each of the four interaction variables related to mothers' emotion and behavior during mother-child interactions. Analyses demonstrated predicted relations between mothers' aversion sensitivity and all four outcomes. The steeper the slope of a mother's negative expression across increases in the aversiveness of child behavior (i.e., her aversion sensitivity), the more aversive her behaviors were throughout the interactions ($\beta = 0.47$, $p < .001$), the more she reciprocated her child's initial expression of negativity ($\beta = 0.07$, $p < .001$), the greater her aversiveness variability was ($\beta = 0.67$, $p < .001$), and the more she tended to "give in" or end negative reciprocities with her child ($\beta = 0.06$, $p < .05$). These effects were independent of both mothers' general levels of negative expression (general negativity) and children's negative reactivity.

Children's emotion and behavior during mother-child interactions. Table 5 presents results from three multilevel models examining mothers' aversion sensitivity, mothers' general negativity, and children's negative reactivity as predictors of each of the three interaction variables related to children's emotion and behavior during mother-child

interactions. Results demonstrated significant associations between mothers' aversion sensitivity and children's aversiveness intercept ($\beta = -0.76$, $p < .001$) and aversiveness slope ($\beta = 0.01$, $p < .05$). The association between mothers' aversion sensitivity and child aversiveness variability, however, was only marginally significant ($\beta = 0.19$, $p = 0.06$). These effects, again, were independent of both mothers' general levels of negative expression (general negativity) and children's negative reactivity.

Dyadic patterns of emotion and behavior during mother-child interactions. Table 6 presents results from two multilevel models examining mothers' aversion sensitivity, mothers' general negativity, and children's negative reactivity as predictors of each outcome related to dyadic patterns of emotion and behavior during mother-child interactions. Analyses of these multilevel models demonstrated predicted relations between mothers' aversion sensitivity and both outcomes. The more aversion-sensitive the mother was during an interaction, the more negative reciprocities the dyad had ($\beta = 0.38$, $p < .001$), and the longer these negative reciprocities lasted ($\beta = 0.35$, $p < .001$). As in the previous sets of models. these effects were independent of both mothers' negativity and children's negative reactivity.

A final noteworthy result are the negative coefficients presented in Table 6 from child negative reactivity predicting the number of negative parent child emotion reciprocities ($\beta = -1.63$, $p < .001$) and length of mother-child negative emotion reciprocity ($\beta = -0.98$, $p < .01$). Although these coefficients are negative, the correlation coefficients of these variables with child negative reactivity as presented in Table 3 are

positive. Investigation of these results, however, revealed that when mothers' general negativity was taken out of the multilevel models predicting the number of negative reciprocities and their length, the coefficient for child negative reactivity flipped signs to become positive (as it is in the correlation table) and is still significant. A possible explanation for these results is that child negative reactivity is a suppressing variable in these models. As shown in Table 3, there is a high correlation between child negative reactivity and mother general reactivity. The high correlation between these 2 variables suggests that, when both mother general negativity and child negative reactivity are included in the same model, they may have a suppressor-suppressed variable relationship that would cause significant changes to the coefficients related to child negative reactivity. Regardless of these effects, predictions by the main variable of interest (i.e., mother aversion sensitivity) was not affected.

Discussion

Considerable research has identified parental negativity as generally unfavorable and harmful for a broad array of family processes, particularly for adaptive forms of parent-child interactions. Yet forms of parental negativity that undermine parent-child interactions have not been empirically distinguished from other forms of negativity that can serve valuable socialization and regulatory functions. This work tested the overarching hypothesis that mothers' emotional sensitivity to aversive child behaviors may regulate negative mother-child interactions. It is commonly suggested that negative mother-child interactions, and mothers' negative reactivity in particular, reflect individual differences in

children's aversiveness and individual differences in the effectiveness of mothers' discipline practices. Although implicated in past research (Beach et al., 2012; Berkowitz, 1974; Vasta, 1982), however, the role of mothers' emotional sensitivity to aversive child input has never been tested. I examined the role of mothers' aversion sensitivity – their tendency to increase negative emotional expression rapidly as children's aversiveness increases – in regulating negative interactions with their children.

Results supported my hypothesized links between mothers' aversion-sensitivity and patterns of negative emotion and behavior during mother-child interactions. Mothers' aversion sensitivity predicted (a) patterns of negative emotion and behavior in mothers, (b) patterns of negative emotion and behavior in children, and (c) dyadic patterns of negative mother-child emotion and behavior. Moreover, these associations held even when controlling for mothers' general tendency to express negative emotion and children's negative reactivity. The findings demonstrate that mothers' expressions of negative emotion that reflect primarily their motivation to reduce their own distress and suppress children's expression of negative emotion promote interaction patterns that are known to increase children's risk for developmental problems (Dix, 1991; Lorber & O'Leary, 2005; Patterson, 2002).

To date, this study is the first to examine the importance of mothers' aversion sensitivity to the regulation of parent-child interactions. Findings from this study suggest that mothers' aversion sensitivity may be problematic for children, first, because it fails to teach children adaptive interaction patterns or provide needed information that children can integrate into models of appropriate expressions of negative emotion and behavior.

Furthermore, findings suggest an underlying process related to the activation of moment-to-moment emotional states that predicts negative interactions known to undermine children's development (Dix, 1991; Lorber & O'Leary, 2005; Patterson, 2002). Last, because data from this study was analyzed using within-person variations in mothers' aversion sensitivity and related interaction patterns, other parenting and child variables such as poor discipline practices, warmth, and others, were essentially held constant. This suggests that constructs that have been emphasized in the past as regulating parent-child interactions (i.e., parenting skills, child temperament) may not capture the full picture of how these interactions develop. Thus, aversion sensitivity may be important in understanding how underlying emotional processes related to stress and reactivity affect day-to-day family interactions.

AVERSION-SENSITIVITY AND MOTHERS' EMOTION AND BEHAVIOR

The first set of hypotheses, that aversion sensitivity will predict patterns of negative emotional expressions in mothers, was supported by findings linking mothers' aversion sensitivity to various emotional characteristics of mothers' behavior during interactions with their children. **Hypothesis 1** was supported: Independent of mothers' general tendencies to be negative, aversion sensitivity predicted mothers' overall level of aversiveness, that is, maternal behavior to which children respond negatively. Because mothers' aversiveness reflects their behaviors' potential to elicit negative emotion in children, this finding suggests that aversion sensitivity leads to behavior that is, at least to some degree, aversive to children. That is, aversion sensitivity appears to increase not only mothers' negative reactivity to children's negative behavior, but also maternal behaviors

that children tend to react to with negative emotion. It is possible that, because aversion sensitivity is impulsive, intense, and emotional, children perceive it as controlling, unjustifiably restricting, unfair and ill-intentioned, and thus may react to it with negative emotion and resistance (Hoffman, 1983; Snyder et al., 2003; Waters, West, & Mendes, 2014). Furthermore, given that parents' reactions to aversive child behaviors are central to coercion theory (Patterson, 1982), my results suggest that emotional states activated in parents during parent-child interactions might be key to regulating coercive family processes. Because aversion sensitivity may promote maternal behavior that is aversive to children, children, in turn, may resist more, which may make mothers more aversion-sensitive. Such an interaction pattern might prevent the dyad from reaching a harmonious state and can lead to difficulties exiting negative cycles (Gottman, 1998; Hollenstein & Lewis, 2006).

Hypothesis 2 was also supported: Aversion sensitivity predicted mothers' tendencies to reciprocate children's initial expression of negative emotion. These results imply that aversion sensitivity may undermine mothers' ability to maintain an optimal level of negative emotion when faced with children's aversive behaviors. Because aversion sensitivity increases mothers' experience of negative emotion when faced with aversive child inputs, it may evoke physiological and emotional feelings of anger, leading to aggression, hostility, and a lack of warmth in mother-child interactions (Berkowitz, 1989). These emotions may leave mothers with few emotional resources to engage in children's emotional and behavioral needs and act in a responsive, child-oriented manner. Successful interactions require that parents' negative emotion be maintained at a level that allows

cooperative dyadic exchanges (Eisenberg, Cumberland, & Spinrad, 1998). Parents who react to aversive child behaviors with negative emotion can escalate the levels of negative emotion experienced by their children. When parents reciprocate—and thus act to punish or suppress children's negativity—children may fail to develop emotion regulation skills (Morris, Silk, Steinberg, Myers, & Robinson, 2007). In fact, children who are punished for the expression of negative emotion learn to suppress that expression, but paradoxically may experience heightened negative reactivity in emotional contexts (Lynch, Robins, Morse, & Krause, 2001). In addition, that aversion sensitivity increases mothers' tendencies to reciprocate is consistent with how coercive interactions unfold. Coercion theory, although it characterizes well interactions that often lead to dysfunctional family processes, has yet to specify the role that emotion plays in coercive interactions (Granic & Patterson, 2006). My finding that aversion sensitivity predicts mothers' reciprocation of children's initial expression of negative emotion, again, suggests that mothers' emotional sensitivity to aversive child behaviors may lead to the activation of emotion that underlies coercive family processes.

Hypothesis 3 was also supported: Aversion sensitivity predicted high variability in the aversiveness of mothers' behaviors. Given that aversive behavior often involves negative emotion (Slep & Lorber, 2005; Watson & Clark, 1984), this finding is consistent with the proposals that emotional variability reflects emotional experience. Emotionally-variable people may be variable precisely because they are affectively sensitive to situational cues and contingencies. This finding implies that aversion sensitivity may be associated with mothers' difficulty to regulate emotions. It has been suggested that

emotional variability reflects the ease with which emotions are elicited by events, a pattern that would be expected among individuals with poor emotion regulation (Thompson, Dizen, & Berenbaum, 2009). Indeed, my data show that on assessments in which mothers exhibit aversion sensitivity, they also tend to exhibit behaviors characterized by high levels of aversiveness (e.g., see Appendix C). Due to the impulsive, intensive, and emotional characteristics of mothers' aversiveness variability, variability may provide children with an unstable and inconsistent emotional environment. Variability in mothers' emotional aversiveness may thus promote conflictual interactions. This may happen, first, because children can't predict when and how mothers will react and may therefore feel frustrated and motivated to act aggressively in response. Second, this may happen because, when mothers fail to regulate their own emotions, they fail to help children regulate emotions (Eisenberg et al., 1996). Parents shape children's acquisition of regulation skills through parent–child interactions (Parke et al., 1992) or by coaching and modeling (Carson & Parke, 1996; Davies & Cummings, 1994). As noted by Eisenberg et al. (1999), "parental coaching helps children to develop the ability to inhibit negative affect, to self-sooth, and to focus attention (including attention in social contexts)" (p.514). Eisenberg and her colleagues also noted that, "Parents who exhibit hurtful and hostile negative emotions frequently may model dysregulated behavior for children to imitate" (Eisenberg et al., 2001, p. 488).

Hypothesis 4, was also supported: Aversion sensitivity was associated with "giving in" to the child. My findings indicate that aversion sensitivity is associated with a higher probability of mothers' capitulation to children's negative behaviors. This finding is

consistent with the proposal that, as children's behavior exceeds the mother's threshold for tolerating aversive input, higher levels of aversion sensitivity predict lower expression of negative emotion as a means of discontinuing the difficult interaction. As proposed in coercion theory, capitulating to children's negative behaviors, however, is not an effective practice. Patterson's insight into "giving-in" is that children's escalation of aversive behavior can be rewarded by the parents' contingent reduction of their own aversive behavior. As a result, the child is negatively reinforced for escalating (via the parent giving in and stopping the fight). The parent is negatively reinforced for giving in (via ending the child's aversive behavior). Thus, once a coercive process is established, both the mother and the child are faced with an unfortunate choice: to either give in and lose the battle, or to win via out-escalating the other. Patterson (1976) elegantly described this unfortunate process, claiming that each is both the "victim and architect of a coercive system". Indeed, when aversive child behaviors become emotionally draining, the elevated levels of negative emotions experienced as a result of aversion sensitivity may lead mothers to withdraw from the increasingly emotionally demanding, negative cycle. By doing so, a mother may establish and maintain an unhealthy pattern of managing child resistance.

AVERSION-SENSITIVITY AND CHILDREN'S EMOTION AND BEHAVIOR

The second set of hypotheses, that aversion sensitivity will be associated with patterns of negative emotional expression in children, was supported. Mothers' aversion sensitivity predicted two emotional characteristics of children's behavior with their mothers. First, it is important to note that **Hypothesis 5 was only partially supported**. My results indicated that, despite hypothesized absence of a significant association between

mothers' aversion sensitivity and children's aversiveness intercept, prior to experiencing the mother's aversion sensitivity, children of aversion sensitive mothers started the interaction exhibiting relatively low aversive behaviors. I can only speculate about why this finding emerged in the data. A possible explanation to this finding is that on days in which children sense that their mothers are aversion-sensitive, they tend to try to avoid activating mothers' negative emotions and reactivity. This may also imply that the level of aversiveness with which children begin interactions with their mothers reflect, not only individual differences in children's aversiveness, but perhaps also children's perceptions of their mothers' tendency to react negatively to child aversive behaviors (e.g., Laible & Thompson, 1998). Consistent with **Hypothesis 5**, however, when mothers were aversion sensitive, children displayed increases in aversiveness as the interaction progressed (i.e., children's positive aversiveness slope across the interaction). The emotion-related changes in parenting associated with aversion sensitivity should increase children's negative reactions to mothers. Aversion-sensitivity reflects the high priority mothers give to self-centered factors—their moods, emotions, and immediate needs, and the low priority they give to child-centered factors. Aversion sensitivity leads mothers to experience negative emotion, which may make their responses more hurtful and hostile (Eisenberg et al., 2001; Snyder et al., 2003). These, in turn, may increase children's arousal (Waters et al., 2014) and promote poor dyadic emotion regulation (Bridgett, Burt, Laake, & Oddi, 2013; Lougheed, Hollenstein, Lichtwarck-Aschoff, & Granic, 2015). These results are consistent with Patterson's proposal that mothers who respond negatively to children's aversiveness elicit reciprocal negativity from children in a series of escalating exchanges. These results

are similar to previous findings relating negative contingencies to dysfunctional interactions. Levenson and Gottman (1983; 1985), for example, found that distressed couples, compared with nondistressed couples, demonstrated more negative dyadic contingencies during conflict. Similar findings have been noted in the developmental literature. Eisenberg et al. (1999) found strong evidence for bi-directional, longitudinal influences, with parents' angry punitive reactions to children's negative emotions associated with children's angry, hostile, and irritable emotional expressions. Similarly, Crockenberg (1985) found that mothers' angry responses to toddlers' negative behavior were associated with persistent anger and noncompliance and less empathic responding to others on the part of the toddlers.

Lastly, **Hypothesis 6**, that Children's aversiveness variability will be greater during interactions in which mothers exhibit greater aversion sensitivity, failed to exceed the significance threshold, yet still indicates a relatively strong statistical trend and is therefore worth interpreting. Emotion variability marks emotional reactivity. In particular, emotional variability characterizes the dynamics of emotions over time and is important for a full understanding of emotional responses (Morris, 1989). My finding linking children's aversiveness variability to mothers' aversion sensitivity suggests that emotional variability may not be only a persistent trait-like disposition in children, but also a variable characteristic that emerges in particular circumstances. This is supported by the previous finding showing that the negative emotional processes in children examined in this study do not start before mothers begin to express aversion sensitivity (i.e., Hypothesis 5). What mechanisms underlie the link between mothers' aversion sensitivity and children's

aversiveness variability is unclear. I offer the hypothesis that aversiveness variability in children results from increases in child's responsiveness to experiences of negative emotion that result from the mother's aversion sensitivity.

It is also possible that children's aversiveness variability results from their failures of emotion-regulation processes aimed at maintaining adaptive and optimal emotional states. Consistent with resource models of self-regulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998), aversiveness variability may reflect what happens when the adaptive processes of emotion responding and control are dampened. It may be that when negative emotion is a prominent characteristic of parent-child interactions, the demand that children suppress these emotions may be sufficiently frequent that it regularly depletes resources children need for adaptive regulatory processes. Moreover, as indicated by the positive association across the entire sample between mothers' aversiveness variability and children's aversiveness variability (r = 0.48), it is possible that children exhibit higher aversiveness variability when faced with more difficult and unstable emotional inputs from mothers. That is, aversion sensitivity may create forms of aversive and reactive emotional expression that children model in response to their mothers. Aversion sensitive mothers model poor emotion regulation for their children. This is consistent with research on children's sensitivity to emotion-inducing events (Pietromonaco & Barrett, 2009). Because negative emotions bias negatively individual's ongoing appraisal processes (see Lerner, Li, Valdesolo, & Kssam, 2015), children may develop increased sensitivity to negative stimuli. Children with greater sensitivity experience greater emotional and physiological responses and respond emotionally to a greater number of emotional cues (Barrett, 2006, 2013;

Pietromonaco & Barrett, 2009). An important direction for future research is thus to study the nature of parent-child interactions in which aversiveness variability in children is displayed, as well as the impact of parents' sensitivity to aversive inputs on children's ability to navigate those interactions successfully.

AVERSION-SENSITIVITY AND DYADIC MOTHER-CHILD EMOTION AND BEHAVIOR

The third set of hypotheses, that aversion sensitivity will be associated with dyadic patterns of emotion and behavior during mother-child interactions, was supported. My results supported **Hypothesis 7:** Aversion sensitivity was associated with frequent mother-child negative emotion reciprocity **and Hypothesis 8:** Aversion sensitivity was associated with longer mother-child negative emotion reciprocity. These results align with my proposal that, by increasing negative arousal to aversive child behaviors, aversion sensitivity should lead mothers to accelerate their own negativity with actions that have high arousal properties, further activating children's negativity. This may lead children to resist and reciprocate mothers' expressions of aversion sensitivity, which, again, should lead to mothers' experiencing and expressing negative emotion, causing children to, again, resist and reciprocate again.

These findings are consistent with recent theories suggesting that emotions may function as self-perpetuating systems that tend to trigger behaviors that make individuals maintain or prolong their current emotional state even when this state is undesired (Garland et al., 2010; Kuppens, Allen, & Sheeber, 2010; Wichers, 2014). This resembles mood-maintenance theories, which postulate that negative emotions elicit behavior and these negative behaviors subsequently maintain or restore original levels of negative emotions

(a positive feedback loop; e.g., Carlson, Charlin, & Miller, 1988; Carver & Scheier, 1990). My findings also support theoretical and empirical efforts that link reciprocation of negative emotion to parents' poor emotion socialization and both parents' and children's difficulty regulating emotions and emotional behavior (Eisenberg et al., 2008). Parents and children can develop patterns of reciprocated emotional exchanges, such that as the parent's negativity increases, the child is more likely to react with increased negativity as well (Patterson, 1980). Such reciprocation may promote problematic outcomes for children. Carson and Parke (1996) found that reciprocal exchanges of negativity between parents and their children were correlated with negative social outcomes, suggesting that children who engaged in reciprocal negative exchanges with their parents were not well accepted by peers. Lindahl and Markman (1990) proposed that children growing up in families that have difficulty de-escalating negative emotions have difficulties recognizing and managing their own negative emotion. From a social learning perspective (Bandura, 1977), children exposed to reciprocated negative emotion may acquire complex repertoires of coercive behaviors. When the mother is aversion sensitive, the child may learn to reciprocate negative emotions not only through relatively frequent observation of maternal reciprocation, but also via the rewarding effects of aversion sensitivity on mothers' tendency to "give in" to the child (Hypothesis 4). My results are also consistent with findings from observational research examining conflict patterns in romantic couples. Distressed couples, compared to nondistressed couples, are less likely to suppress anger display during conflict, resulting in longer negative reciprocity cycles. In fact, numerous laboratory studies trying to disentangle the effects of distress on marital conflict found

similar patterns (e.g., Leonard & Roberts, 1998). Convergence of my results from studying mothers' aversion sensitivity with findings from research on distressed couples suggests a potential emotional basis underlying long reciprocations of negativity. It is possible that, just as activation of negative emotion in the case of aversion sensitivity results from hypersensitivity to aversive child behaviors, negative reciprocity in distressed couples could results from activation of negative emotion that stems from hypersensitivity to partner criticism, complaint, blaming, domineering, and other aversive spousal behaviors (Gottman, 1994).

IMPLICATIONS FOR COERCION THEORY

My results demonstrate the potential importance of emotions to understanding coercive family processes. Coercion theory addresses why dyads persist in performing reciprocally-negative behaviors despite their unpleasant and destructive nature. However, coercion theory has yet to specify the emotional processes that underlie coercive cycles (Granic & Patterson, 2006). Coercion theory's main focus is on observable, interpersonally-evoked negative behavior. Analysis of intraindividual processes driving a parent's or a child's negativity are unclear.

My findings suggest, first, that the distress experienced by mothers when they are aversion sensitive motivates persistent negativity in the face of aversive child behavior. Coercion theory postulates that partner's negative behavior is aversive and activates regulatory efforts to reduce or terminate this behavior. However, coercion theory does not address the emotional states that that aversive behaviors arouse. Aversive inputs from children arouse negative emotions in some mothers more than in others and require them

to regulate these emotions. The experience of negative emotions and the need to regulate them may thus be key to understanding some of the affective processes that underlie coercive family processes.

Second, aversion sensitivity may lead mothers to capitulate when children's resistance elicits levels of distress that aversion sensitive mothers have difficulty tolerating. Because negative emotion is an aversive state that mothers seek to reduce or terminate, feedback about the success of these regulatory efforts is likely derived from reductions in experienced negative emotion. Thus, reductions in mothers' own negative emotion provides an affective basis for why capitulation to children's aversive demands is reinforcing and why some mothers, aversion-sensitive mothers, are at increased risk for this destructive pattern.

Third, aversion sensitivity may increase dyads' rigidity and difficulty exiting reciprocally negative exchanges (Hollenstein & Lewis, 2006). Aversion sensitivity leads a mother to experience high and potentially accelerating levels of negative emotion that drive her motivation to suppress the aversiveness the child is displaying. Furthermore, by activating negative emotions in children, mothers' aversion sensitivity may maintain the aversive child behaviors to which mothers are sensitive (Snyder et al., 2003). Although explicitly coercive exchanges were not examined here, relations between mothers' aversion sensitivity and negative parent-child interactions are consistent with coercion theory.

In summary, negative emotion expressed as a result of aversion sensitivity may be functional to parent-child dyads in the short term because it may end the negative cycle. In the long term, however, expressions of negative emotions associated with aversion

sensitivity should be problematic for the child, the parent, and the parent-child relationship. Understanding why parents and children persist in expressing negative and aversive behaviors despite their destructive qualities, or how some dyads can exit cycles of negative reciprocity whereas others cannot, requires a better understanding of the rewarding qualities that accompany reduction of negative emotion. Understanding the moment-to-moment nature of negative emotional experience and expression in parent-child interactions and the functions of expressing negative emotion will enhance my understanding of coercive family processes.

FUNCTIONS OF EMOTION IN PARENT-CHILD INTERACTIONS

My results showing that aversion sensitivity predicts emotions and reactions imply the complex role sensitivity to child aversive behaviors may play in regulating mothers' emotion and behavior, children's emotional reactions, and sequences of emotional expressions over mother-child interactions. Findings from this study provide support for Dix's (1991) affective model of parenting. Dix (1991) highlighted parents' motivation, emotion, and the ability to regulate them, as key to effective parenting. High levels of parental negative emotion in response to aversive child behaviors, as is the case with aversion sensitivity, may compete with a parent's cognitive and emotional resources, thus interfere with perceiving and prioritizing the child's signals, and result in less effective parental responses. This idea was supported by both classic parenting literature and literature outside the parenting domain, showing that emotion controls sensitivity and attention to stimuli, as well as allocation of processing time and capacity (Derryberry & Rothbart, 1984; Easterbrook, 1959; Frijda, 1986). This idea is also supported by more

recent neurobiological research showing that, when distressed, neural processing regions in the brain that underlie the handling of emotional inputs, including the hippocampus and the amygdala, are adversely affected, which in turn may result in excessive bias toward negative inputs (Ericson, Drevets, & Schulkin, 2003). Thus, within the context of this study, the impact of increased negative emotion arising from aversive child behaviors may undermine the attentional and cognitive requirements necessary for parents to effectively process children's behaviors and arrive at consistent and appropriate parental reactions as they may be prone to more negative biases as well as limited emotional resources to effectively administer parenting in difficult parent-child interactions. Earlier research provides partial support to this interpretation of the findings. For example, Martorell and Bugental (2007) reported that elevated cortisol (i.e., increased distress) during stressful mother-child interactions mediated the relation between mothers' perceptions of their children as difficult and their increased use of harsh discipline with their children. Furthermore, because aversion sensitivity leads parents to activate negative emotion whenever children emit aversive behavior, regulation of these emotions can become difficult to achieve. Because parents' responses are emotion-driven, they may be more impulsive, hostile, and hurtful (Eisenberg et al., 2001; Snyder et al., 2003). In sum, experiencing heightened negative emotional arousal in response to aversive child behavior may undermine the extent to which parents' emotions function to promote effective, child-oriented parental responses.

IMPLICATIONS FOR INTERVENTIONS

This study is of interest because of its promise to better clarifying emotion-based processes that identify crucial elements of expressing negative emotions to children, thereby potentially informing interventions. Findings from this study suggest that, in an effort to improve family environments characterized by difficult, coercive parent-child interactions, intervention programs should target and address, in addition to parental behavioral skills (e.g., Forehand, Lafko, Parent, & Burt, 2014; Piquero et al., 2016), emotional states and emotional problems in parents that may make them particularly prone to engage in negative interactions with their children. Because an underlying state of mothers' aversion sensitivity may be stress and other psychological strains, intervention programs that emphasize not only child management skills, but also parents' stress management, hold promise for improving parent-child interactions and relationships. A second factor that may enhance the effectiveness of interventions aimed at reducing negative, coercive family process is improving parents' awareness of negative emotions that generate and maintain difficult interactions with their children. Parents who are aware of their own negative emotions and demonstrate an ability to discuss these emotions often are also aware of negative emotion in their children and assist their children in dealing with negative emotions (Gottman et al., 1996). Furthermore, positive associations have been found between parents' awareness of their own negative emotion and children's ability to regulate their emotion, behavior and attention (e.g., Shortt, Stoolmiller, Smith-Shine, Mark, & Sheeber, 2010). Last, results from this study provide new evidence for the importance of emotion regulation to socialization efforts and behavior of parents during negative interactions with their children. Teaching parents to regulate distressing emotions that interfere with effective parenting may help, not only with improving parents' socialization efforts, but may also model adaptive regulation of emotion for children.

LIMITATIONS

There are several important limitations to the current study that future research needs to address. First, observed in a divorcing sample, the present findings may reflect in part the high stress being experienced in these families. Replication with an average or low-risk sample would clarify whether relations observed here occur in other samples and contexts. Second, the mother-child interaction task used in this study yielded relatively low frequencies of negative affect from mothers. It would be helpful for future research to include more emotion-arousing interactions, especially those that tap parenting difficulties (e.g., discipline, affection, competence, and emotional control). Third, a mother's sensitivity to aversive input was inferred from the rate at which her negative expression increased as the aversiveness of child behavior increased (i.e. her frequency of displayed negative emotion). Replication with other measures of aversion sensitivity is needed (e.g., observed intensity of negative emotion, physiological measures). Fourth, variables that reflect low parenting competence covary, making their independent effects difficult to disentangle. Although my within-dyad design controlled for many third variable explanations, mothers high in aversion sensitivity might also be intrusive, low in warmth, or likely to experience stronger emotional states than other mothers. Research is needed to clarify which aspects of parenting linked to aversion sensitivity are principally responsible to relations with negative parent-child interactions.

CONCLUSION

Developmental researchers have long stressed the potential role of emotions in organizing parent-child interactions (e.g., Dix, 1991). Results from this study offer a

framework for understanding why, in some parents but not in others, aversive child behaviors increase negative emotions that regulate difficult parent-child interaction. My findings supported the hypothesis that parents' aversion sensitivity may be an underlying emotional process for understanding why difficult interactions occur in some families more than in others. This study implies that parents' expressions of negative emotion promote negative parent-child interactions to the extent that they are parent-oriented, and specifically, are focused on minimizing parental distress and reducing aversive input from children. Although negative emotions in parents may enable negative feedback to be beneficial and socialization-oriented, my findings suggest that the ability of aversion sensitivity to shape adaptive interactions or provide needed information that children can integrate into models of appropriate emotion and behavior is limited.

Consistent with emotion theories, my results imply that parents' emotions and emotional expressions are causal events in the sense that they influence the behavior of children, and as a result, the entire parent-child interaction. My results suggest that emotions emerge from parent-child interactions, which they in turn constitute, shape, and change. The point is not that emotions occur in response to the parent-child interaction; rather, it is that the interaction itself and the emotions it elicits form a single system (Barrett, 2013; Butler, 2011; Hollenstein & Lewis, 2006).

My findings suggest the importance of understanding (1) the associations of parents' qualities of negative emotions with children's perceptions and reactions to expressions of these emotions, and (2) the functions that negative emotions have in reinforcing and rewarding difficult, coercive family processes. Understanding these factors

holds promise for clarifying how to intervene to reduce parent-child interactions that are known to be problematic for children's development.

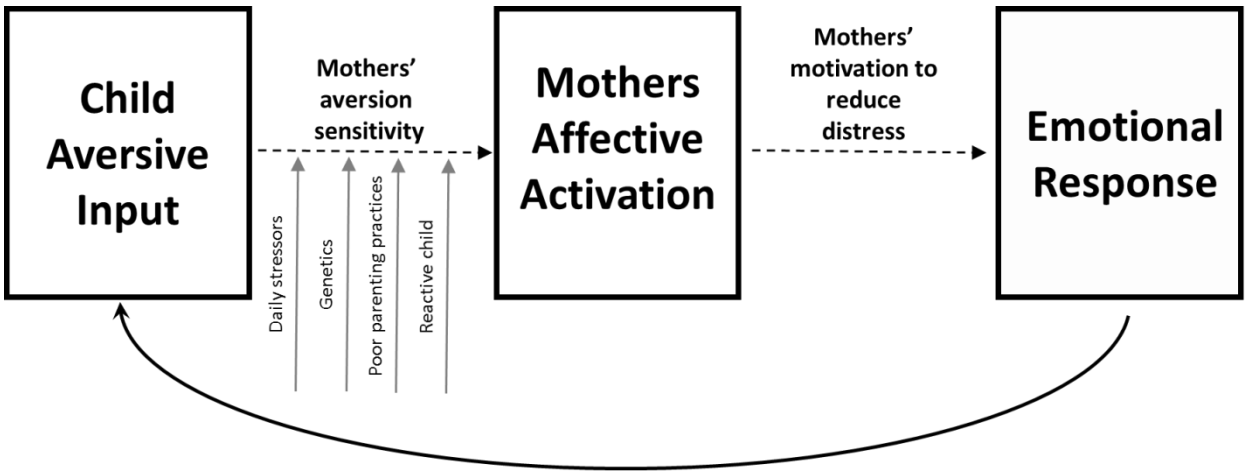


Figure 1*:* A theoretical model for the role of aversion sensitivity in the development and persistence of negative mother-child interactions.

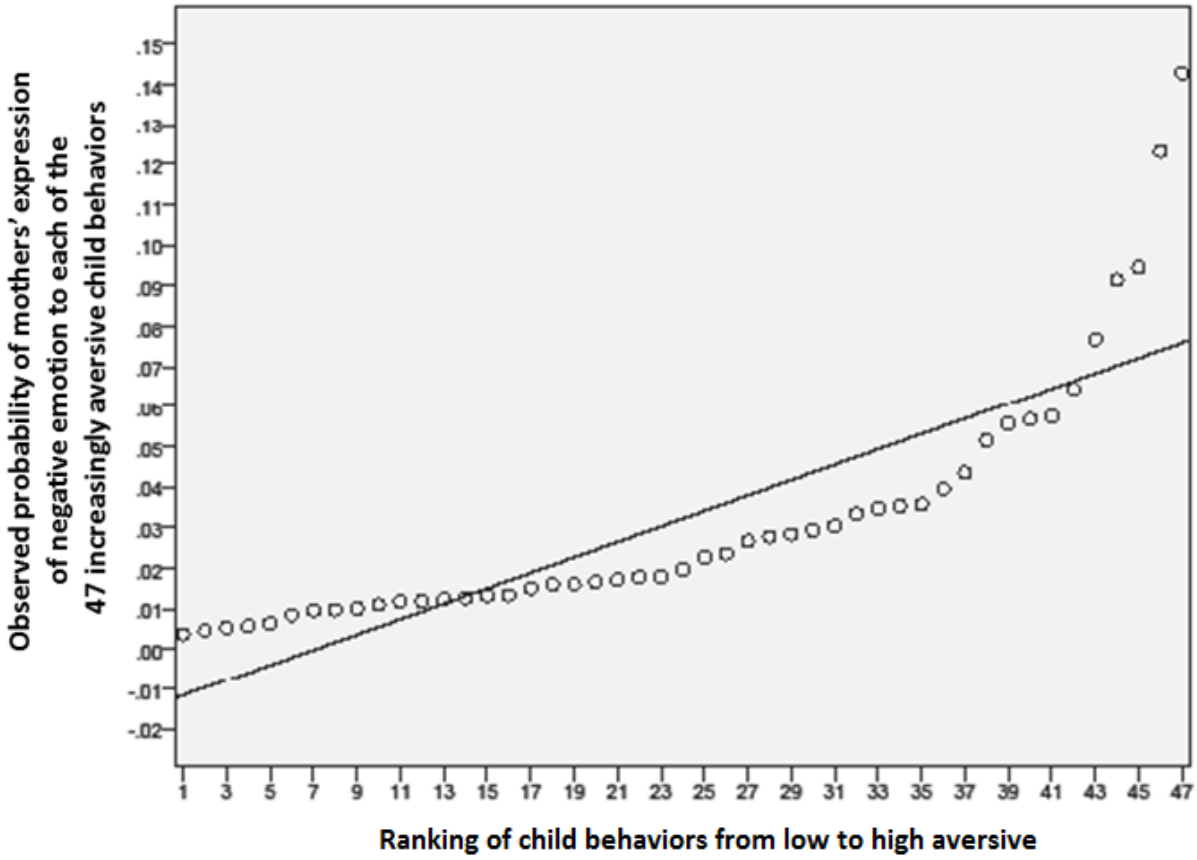


Figure 2: Plotting the slope of each mother's expression of negative emotion across increases in the aversiveness of children's behaviors. Based on a 3-level multilevel model, the graph shows the average across the entire sample and a best-fitting line.

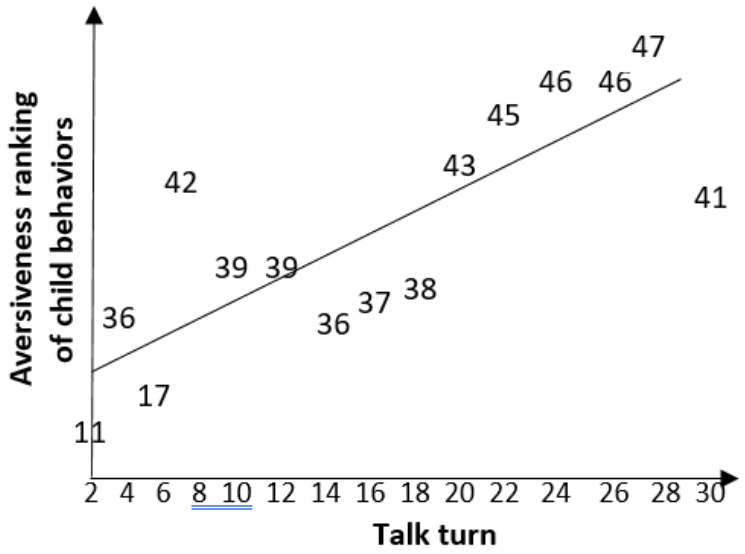


Figure 3: An illustration of child aversiveness intercept and aversiveness slope. The x-axis represents talk turns throughout the interaction, and the y-axis represents the aversiveness ranking of the child behavior at each talk turn.

Aversiveness Ranking (lowest to highest)	Child Behavior– Code name (content; affect)	Child Behavior – Code number (content; affect)	Negative Elicitation Frequency (%)	Interaction Count	Dyad Count
1	Neutral nonverbal; Sad	72; 6	0.4	75	57
2	Positive interpersonal; Neutral	21; 3	0.5	132	105
3	Self-disclose; Neutral	32; 3	0.6	194	140
4	Vocal; Neutral	62; 3	0.7	878	315
5	Neutral nonverbal; Neutral	72; 3	0.75	808	310
6	Endearment; Neutral	31; 3	0.8	56	48
7	Touch/Hold; Happy	91; 1	0.9	42	36
8	Advice; Happy	41; 1	1	115	92
9	Positive talk; Happy	11; 1	1.1	210	147
10	Neutral nonverbal; Happy	72; 1	1.2	177	125
11	Talk; Neutral	12; 3	1.25	919	318
12	Negative talk; Neutral	13; 3	1.3	685	294
13	Talk; Happy	12; 1	1.4	764	306
14	Comply; Neutral	01; 3	1.5	645	287
15	Positive nonverbal; Happy	71; 1	1.6	208	147
16	Vocal; Happy	62; 1	1.7	685	289
17	Negative talk; Happy	13; 1	1.9	171	133
18	Vocal; Sad	62; 6	2	70	55
19	Tease; Neutral	22; 3	2.1	15	13
20	Agree; Neutral	51; 3	2.3	161	117
21	Positive interpersonal; Happy	21; 1	2.6	47	39
22	Neutral nonverbal; Distress	72; 4	3.2	58	52
23	Refuse; Neutral	53; 3	3.3	56	50
24	Talk; Sad	12; 6	3.8	162	118
25	Negative interpersonal; Neutral	23; 3	3.9	116	97
26	Negative interpersonal; Happy	23; 1	4.2	36	34
27	Negative talk; Sad	13; 6	4.3	37	32
28	Self-disclose; Sad	32; 6	4.4	19	18
29	Non-comply; Neutral	03; 3	4.6	307	194
30	Physical aversive; Happy	83; 1	5.5	23	20
31	Positive talk; Distress	11; 4	6.5	25	24
32	Verbal attack; Happy	33; 1	6.7	13	13
33	Negative interpersonal; Hostile	23; 5	6.9	15	15

34	Self-disclose; Distress	32; 4	7	31	26
35	Talk; Distress	12; 4	7.9	615	282
36	Verbal attack; Neutral	33; 3	8	11	8
37	Physical aversive; Neutral	83; 3	8.7	41	33
38	Talk; Hostile	12; 5	9	273	162
39	Advice; Distress	41; 4	9.4	23	22
40	Negative talk; Hostile	13; 5	10.5	51	43
41	Vocal; Distress	62; 4	10.7	293	188
42	Negative talk; Distress	13; 4	12.8	243	161
43	Command; Hostile	42; 5	15.4	20	19
44	Vocal; Hostile	62; 5	15.6	58	53
45	Command; Distress	42; 4	16.3	47	42
46	Negative interpersonal; Distress	23; 4	20.5	21	20
47	Tease; Hostile	22; 5	28.2	5	5

Table 1: Ranking of children's aversiveness

Note. Explanations for all content and affect codes can be found in Appendix B; Negative elicitation frequency represents the percentage of instances this child behavior elicited negative affect from the mother; Interaction count represents the number of interactions in which this behavior (combination of content and affect) appeared; Dyad count represents the number of dyads in which this behavior (combination of content and affect) appeared.

Aversiveness Ranking (lowest to highest)	Child Behavior– Code name (content; affect)	Child Behavior – Code number (content; affect)	Negative Elicitation Frequency (%)	Interaction Count	Dyad Count
1	Neutral nonverbal; Happy	72; 1	0.00	23	21
2	Tease; Happy	22; 1	0.00	23	23
3	Positive nonverbal; Neutral	71; 3	0.00	31	27
4	Negative talk; Distress	13; 4	2.44	34	31
5	Neutral nonverbal; Neutral	72; 3	2.70	473	251
6	Verbal attack; Neutral	33; 3	3.13	27	26
7	Self-disclose; Neutral	32; 3	3.61	73	61
8	Vocal; Neutral	62; 3	3.64	829	309
9	Positive talk; Neutral	11; 3	3.66	491	264
10	Talk; Sad	12; 6	4.17	12	11
11	Comply; Neutral	1; 3	4.44	160	120
12	Command; Happy	42; 1	4.64	121	94
13	Tease; Neutral	22; 3	4.76	35	32
14	Vocal; Caring	62; 2	5.00	20	19
15	Negative interpersonal; Happy	23; 1	5.00	33	32
16	Vocal; Happy	62; 1	5.14	689	283
17	Positive talk; Happy	11; 1	5.19	66	61
18	Advice; Happy	41; 1	5.36	54	45
19	Talk; Happy	12; 1	5.47	723	304
20	Talk; Neutral	12; 3	6.08	919	317
21	Positive nonverbal; Happy	71; 1	6.12	81	70
22	Touch/Hold; Neutral	91; 3	6.31	478	249
23	Positive interpersonal; Neutral	21; 3	6.37	468	252
24	Touch/Hold; Happy	91; 1	6.38	38	35
25	Negative talk; Neutral	13; 3	6.62	545	272
26	Negative talk; Happy	13; 1	6.85	64	55
27	Physical interact; Neutral	92; 3	7.43	289	179
28	Advice; Neutral	41; 3	7.55	796	306
29	Vocal; Distress	62; 4	7.94	52	44
30	Command; Neutral	42; 3	8.49	671	289
31	Physical aversive; Happy	83; 1	8.70	17	16
32	Agree; Neutral	51; 3	8.96	104	86
33	Negative interpersonal; Hostile	23; 5	9.09	18	16

34	Talk; Caring	12; 2	9.50	225	153
35	Command; Hostile	42; 5	9.62	60	48
36	Endearment; Caring	31; 2	10.00	42	37
37	Positive interpersonal; Happy	21; 1	10.77	57	50
38	Physical aversive; Neutral	83; 3	10.87	29	21
39	Non-comply; Neutral	3; 3	12.00	90	69
40	Negative interpersonal; Neutral	23; 3	13.18	432	247
41	Talk; Distress	12; 4	13.35	248	165
42	Neutral nonverbal; Distress	72; 4	13.51	27	25
43	Endearment; Happy	31; 1	13.64	22	21
44	Endearment; Neutral	31; 3	13.91	228	155
45	Positive interpersonal; Caring	21; 2	13.95	41	37
46	Vocal; Hostile	62; 5	14.29	20	18
47	Command; Distress	42; 4	15.00	32	28
48	Negative interpersonal; Distress	23; 4	16.67	16	15
49	Refuse; Neutral	53; 3	19.75	118	87
50	Talk; Hostile	12; 5	27.27	144	104

Table 2: Ranking of mother's aversiveness

Note. Explanations for all content and affect codes can be found in Appendix B; Negative elicitation frequency represents the percentage of instances this mother behavior elicited negative affect from the child; Interaction count represents the number of interactions in which this behavior (combination of content and affect) appeared; Dyad count represents the number of dyads in which this behavior (combination of content and affect) appeared.

		Mean	SD	Range (min; max)	1	2	3	4	5	6	7	8	9	10	11	12
1	Mother aversion sensitivity	0.69	1.55	-0.42; 10.41	1											
2	Mother average aversiveness	20.35	1.58	14.90; 35.80	0.29	1										
3	Mother reciprocating child's initial negativity (%)	0.09	0.26	0.00; 100	0.38	0.24	1									
4	Mother aversiveness variability	5.77	1.43	0.76; 14.41	0.35	0.41	0.24	1								
5	Mother ending negative reciprocity (%)	0.10	0.28	0.00; 100	0.13	0.24	0.25	0.27	1							
6	Child aversiveness intercept	11.49	3.56	-2.87; 36.36	0.09	0.35	0.19	0.25	0.18	1						
7	Child aversiveness slope	0.01	0.34	-0.11; 0.44	0.04	0.03	0.10	0.02	0.11	-0.52	1					
8	Child aversiveness variability	5.52	2.03	1.90; 13.83	0.24	0.49	0.37	0.48	0.40	0.56	0.16	1				
9	Number of negative reciprocities	0.30	0.85	0.00; 10.00	0.45	0.42	0.53	0.44	0.54	0.26	0.07	0.48	1			
10	Length of negative reciprocities	0.40	0.90	0.00; 5.00	0.44	0.39	0.71	0.40	0.74	0.26	0.10	0.52	0.75	1		
11	Child negative reactivity (%)	0.03	0.12	0.00; 96	0.07	0.41	0.25	0.21	0.21	0.62	0.30	0.76	0.32	0.35	1	
12	Mother general negativity (%)	0.08	0.10	0.00; 39	0.23	0.50	0.38	0.40	0.39	0.65	0.12	0.86	0.57	0.55	0.78	1

Table 3: Means and correlations among key variables for all 919 mother-child interactions.

Note. Although these means and correlations are unbiased estimates, the intentionally unbalanced design means that standard errors and significance tests cannot be meaningfully computed.

	Mother average aversiveness		**Mother reciprocate child's initial negativity**		**Mother aversiveness variability**		**Mother end negative reciprocity**	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Mother aversion sensitivity, β1	0.47***	0.09	0.07***	0.02	0.67***	0.06	0.06*	0.03
Mother general negativity, β2	7.11***	1.37	0.81***	0.18	5.08***	0.97	1.21***	0.18
Child negative reactivity, β3	-0.30	0.83	-0.08	0.10	-1.24	0.72	-0.19	0.10
Mother age, β4	-0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
Child age, β5	-0.13***	0.03	0.00	0.00	-0.08**	0.03	0.00	0.00
Child gender, β6	-0.13	0.11	0.00	0.02	0.12	0.10	0.00	0.02
Mother employment, β7	0.04	0.13	-0.04	0.02	0.01	0.13	0.00	0.03
Residual variance								
	1.66***	0.12	0.05***	0.01	1.48***	0.08	0.07***	0.01

** p < .05, ** p < .01, *** p < .001.*

Table 4: Results from multilevel models predicting mothers' emotion and behavior during mother-child interactions

	Child aversiveness intercept		**Child aversiveness slope**		**Child aversiveness variability**	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Mother aversion sensitivity, β1	-0.76***	2.22	0.01*	0.00	0.19^{+}	0.12
Mother general negativity, β2	24.76***	2.93	-0.11	0.06	13.61***	1.68
Child negative reactivity, β3	-0.20	2.42	0.15**	0.06	4.30***	0.92
Mother age, β4	0.05**	0.02	0.00	0.00	0.01	0.01
Child age, β5	0.01	0.06	0.00	0.00	-0.11***	0.02
Child gender, β6	0.08	0.20	0.00	0.00	-0.02	0.07
Mother employment, β7	0.19	0.25	0.00	0.00	0.09	0.10
Residual variance						
	9.66***	1.04	0.00***	0.00	0.88***	0.15

** p < .05, ** p < .01, *** p < .001.*

Table 5: Results from multilevel models predicting children's emotion and behavior during mother-child interactions

	Number of negative reciprocities		**Length of negative reciprocities**	
	Coefficient	SE	Coefficient	SE
Mothers aversion sensitivity, β1	0.38***	0.06	0.35***	0.05
Mothers general negativity, β2	5.45***	0.81	4.93***	0.56
Child negative reactivity, β3	-1.63***	0.44	-0.98**	0.34
Mother age, β4	0.00	0.00	0.00	0.00
Child age, β5	0.03*	0.01	-0.01	0.01
Child gender, β6	0.04	0.04	-0.04	0.05
Mother employment, β7	-0.05	0.05	-0.06	0.06
Residual variance				
	0.38***	0.07	0.46***	0.03

** p < .05, ** p < .01, *** p < .001.*

Table 6: Results from multilevel models predicting dyadic mother-child emotion and behavior during mother-child interactions

Appendix A: Affect and Content Codes from the Family and Peer Process Code

I. Content Codes:

10-50 Verbal Behavior:

- 10 – Conversation
  - 11 – Positive Talk
  - 12 – Talk
  - 13 – Negative Talk
- 20 – Interpersonal
  - 21 – Positive Interpersonal
  - 22 – Tease
  - 23 – Negative Interpersonal
- 30 – Strong Interpersonal
  - 31 – Endearment
  - 32 – Self Disclose
  - 33 – Verbal Attack
- 40 – Directives
  - 41 – Advice
  - 42 – Command
  - 43 – Coerce
- 50 – Responses to Directives
  - 51 – Agree
  - 52 – Refuse

60 Vocal Behavior:

- 60 – Vocal Behavior
  - 62 – Vocal

70 Nonverbal Behavior:

- 70 – Nonverbal Behavior
  - 71 – Positive Nonverbal
  - 72 – Neutral Nonverbal
  - 73 – Negative Nonverbal

80-90 Physical Behavior:

- 80-90 Physical Behavior
  - 83 – Physical Aversive
  - 91 – Touch/Hold
  - 92 – physical Interact
  - 93 – Physical Aggression

00 Compliance Behavior:

- 01 – Comply
- 03 – Non-Comply

II. Affect Codes:

Affect 1: Happy
Affect 2: Caring
Affect 3: Neutral
Affect 4: Distress
Affect 5: Hostile
Affect 6: Sad

Appendix B: Content and Affect Codes Overview

Content Codes Overview

Content codes describe interactive behaviors by the focus or by another family member interacting with the focus. The content codes are divided among five relatively independent categories, namely Verbal, Vocal, Nonverbal, Physical and Compliance Behavior.

01. Comply: The act of clearly obeying another's request or command. Compliance is double coded with actual compliant response, where compliance is entered first and then followed by the complying behavior. If the coded activity describes the compliant behavior, simply record the compliance (01). E.g. "John, put your toys away and get out the Monopoly game." Command (42) (Puts his toys away) (01)

03. Noncomply: Any act of clearly disobeying another's request or command. Noncompliance is also double coded with actual noncompliant response, where noncompliance is entered first and then followed by the noncomplying behavior.

11. Positive Talk: Includes verbal expressions of approval of appearance, behavior, state or conditions directly related to person(s) outside the session. Also includes verbal expression of support or empathy for person(s) outside the session. Verbal behavior coded 11 must be explicit enough that if the statement were read **in context** it would be coded 11, regardless of the accompanying affect. E.g. "I like the color red." (11) "I think he's cute." (11)

12. Talk: This is a code for general conversational verbal interaction, including gossip, chit-chat about routine matters, conversation about past or present, verbal acknowledgment of another's statement, and agreements or disagreements with another's factual statement. E.g. "When are soccer games this week?" (12) "Did you get an F on your test?" (12)

13. Negative Talk: This code describes negative verbal behavior that refers to person(s) not present in the session as well as all general complaints and cursing. Negative Talk includes blame, tattling, and statements of negative emotion and criticism of someone not present in the session as well as all complaints and criticisms regarding situations, occurrences, preferences, or objects. Complaints relating to the self that do not fit the definition of Self-disclose (32), will be coded Negative Talk (13). E.g. "This place is a mess." (13) "I never agree with him." (13)

21. Positive Interpersonal: Includes verbal expressions of approval of a person's behavior, appearance, or state or conditions directly related to a person present in the session. Also includes verbal expressions of support or empathy for a person present in the session. Verbal behavior coded 21, must be explicit enough so that if the statement were read in context, it would be coded 21 regardless of accompanying affect. Apologies, thanks, compliments, and volunteers regarding someone present are also coded (21). This code does not represent unqualified blanket or personalized praises such as "You're terrific."

These are coded Endearments (31). The Positive Interpersonal code is descriptive of actions, not persons and has to be directly relevant to a person present in the session. This code also includes positive exclamations directed toward someone in the session. E.g. "These hamburgers are good." (Mom made them and she is present) (21) "You got it right!" (21)

22. Tease: Patently absurd or exaggerated statements, questions, or suggestions are coded 22.
Also includes verbal jokes or humor addressed to self or someone in the observation.
Mimicking others by repeating their words verbatim or imitating someone's voice or manner of speaking. Phrases that describe behaviors coded as Tease are banter, playful pestering, and gentle wit directed at others. Statements coded Tease can be coded with positive, negative, or neutral affect. E.g. "You wanna borrow a dollar? Six percent interest!" (22) "Listen stranger, this kitchen ain't big enough for you and me." (22)

23. Negative Interpersonal: Includes verbal expressions of disapproval of a person(s) behavior, appearance, or state or conditions directly related to a person present in the session. Verbal behavior coded (23), like (21) Positive Interpersonal, must be explicit enough so that if the statement were read in context, it would be coded (23) regardless of accompanying affect. Not included in this category are negative self-statements and admissions of failure, as these are coded Self-Disclose (32) or Negative Talk (13). All other complaints that do not relate to a person present are coded (13) Negative Talk. This code does not represent unqualified, personalized attacks, criticisms, or name calling of another person present, as these are coded (33) Verbal Attack. This negative interpersonal code is descriptive of actions, not persons and includes statements of blame and negative emotion regarding someone present in the session. E.g. "You aren't doing that right." (23) "What do you mean you don't know?" (23)

31. Endearment: Endearment refers to personalized and unqualified approval of a person present, or vague statements of unqualified positive emotion toward a person present in the session. It may also include positive name calling which is complimentary in context or pet names and nicknames signifying affection. E.g. "You're one of the most thoughtful people I know." (31) "I love you." (31)

32. Self-Disclose: Self-disclosures are statements that reveal important information about the speaker including family experiences that directly affect the child/person. These can be descriptions that are not always directly observable in the course of day-to-day interactions with others. Self-disclosures do not include exaggerated or blatantly unrealistic statements about oneself either positive or negative as these will be coded Talk (12). "I'm mean, I hit back." (32) "I think I'm in love." (32) "I never know what to say when I'm on the phone with her." (32)

33. Verbal Attack: Verbal Attack refers to personalized and unqualified disapproval of a

person present or vague statements of unqualified negative emotion toward a person present in the session. Name-calling, threats, and specific humiliation of a person present in the session are coded as Verbal Attack (33). E.g. "You'll never amount to anything." (33) "I hate you." (33)

41. Advise: Comments that teach a behavior or specific skill. This definition includes giving directions or instructions, explanations of how thing work or why things are, answers to questions that teach an individual something they didn't know or facilitate carrying out a task, suggestions on what to do in particular situations, questions or suggestions that serve to lead an individual to make appropriate choices or learn a skill, and statements of one's expectations for another's behavior. E.g. "What if you walked away from a fight?" (41) "Put the comet on the stain and sprinkle it with water. Then let it sit for a few minutes. That lets the bleach work. Then if you scrub it with your sponge, the whole sink will be clean." (41)

42. Command: Includes firm directives for behavior change as well as questions or requests for behavior change. To code (42) Command, the desired behavior change must be potentially observable within the context of the observation. An exception is a request for permission, which need not pertain to the immediate time frame. E.g. "Please pick up your toys now." (42) "Can I go over and pick that up?" (42)

43. Coerce: Threatening directives that express a demand for behavior changes are coded Coerce. The threat must imply impending physical, emotional or psychological harm for the command to be coded Coerce. It may be that the threat is nonverbal, such as raising a hand in a menacing gesture, but in all cases the initiator must convey intentions of some personal injury, although the exact nature or extent of the injury may be somewhat unclear. Commands that are expressed with a negative affect are not necessarily coded Coerce. E.g. "If you don't come here I won't love you anymore." (43) "You better stop hitting your sister, or else." (43)

51. Agree: Verbal Acquiescence to a directive, or granting permission in response to a request. Agree can only follow a directive. Also included are partial agreements with a request or command and statements implying eventual compliance. However, agreements of fact are coded Talk (12). E.g. Mother, "Jason, it's time to take a bath." Command (42) Jason, "O.K." (51).

53. Refuse: Includes both explicit verbal response and implied verbal response to a directive indicating that one will not comply or grant permission. Partial refusals, or statements implying refusal to a directive, are coded 53. Disagreements with facts are coded Talk (12). E.g. "No way." (53) Child, "Mom, can I go out now?" Command (42) Mother, "Not now." (53).

62. Vocal: Any audible vocal expressions, including laughter, sobbing, or neutral vocal expressions of acknowledgement. E.g. laughter, humming, crying, sighing.

71. Positive Nonverbal: Any nonverbal and nonvocal behavior indicating acceptance, approval, agreement, or affirmation of another person or behavior, including positive facial expressions or hand gestures. Handing or offering objects or food to another person is coded 71, when there is very little or no physical contact between interactants. Nonverbal agreement with a request or directive is coded 71. E.g. smiles, winks, thumbs up sign, okay signal.

72. Neutral Nonverbal: Nonverbal and nonvocal acknowledgement of another's behavior, including head movement, hand gestures or facial expression. Neutral nonverbal is coded for nonverbal and nonphysical behaviors that are interactive and not accompanied by verbal or physical behavior. Receiving food or objects from another is coded 72. E.g. Child, "Mom, do you know where my homework is?" Talk (12) Mother, (shrugs her shoulders) Neutral Nonverbal (72).

73. Negative Nonverbal: Nonverbal gestures that are threatening, belittling, or any derogatory facial expressions or hand gestures. Taking an object (e.g. pencil) or food away from another's possession when there is little or no physical contact is coded 73. Nonverbal refusals of a request or directive are coded 73. E.g. Shaking a finger or fist, stomping, shaking head "no" following a request.

83. Physical Aggresion: Any low-grade aversive physical contact, including light hitting, pinching, slapping, ear flicking, grabbing another's hand, destructiveness to objects, or cruelty to animals. Physical Aggression is differentiated from Touch by the inherent aversiveness of the physical behavior, not necessarily by the recipient's response nor the initiator's valence. Physical Aggression describes aversive physical contact that is delivered with very little force. E.g. shoving, light spanking, spitting.

92. Physical Interact: Physical Interact represents any directive physical contact which is inherently neutral or nonaversive such as in holding a child back as in restraint, guiding an individual to a location, or taking a child's hand to help in feeding is coded 92. Includes physical interaction such as arm wrestling, wrestling, or other pronounced physical play. Self-grooming or grooming another will be coded 92. The recipient of a 92 is only coded 92 when he/she is actively reciprocating with directive physical behavior. E.g. Combing child's hair, piggy back rides.

93. Physical Attack: Any aversive physical contact described as delivered with moderate to severe force. Aversive physical contact such as moderate to hard kicking, punching, slapping or hitting with an object, and destruction of objects are examples. Physical Attack is differentiated from Physical Aggressive (83) in the amount of force used in the aversive physical contact. E.g. Moderate to hard kicking, hitting with an object.

Affect Codes Overview

Affect codes describe the ongoing nonverbal and emotional displays of the subject. There are six affect codes designed to measure several distinct types of emotional displays: 1. Happy, 2. Caring, 3. Neutral, 4. Distress, 5. Aversive, 6. Sad.

1. Happy: Affect 1 is coded when the person is displaying happiness, either through his/her facial expression (e.g., smiling), tone of voice (e.g., high pitch, fast pace), or body language (e.g., jumping up and down in excitement). Irony that is light-hearted in nature (i.e., that is not hurtful to another person) will also be coded Affect 1. Words that describe Affect 1 include: Amused, excited, glad, funny, jocular, light-hearted, pleased.

2. Caring: Affect 2 is coded when the subject is conveying warmth, affection, supportiveness, concern and interest for another. It may be coded when the subject is talking or acting in a soothing or
empathetic manner as well as when the subject is showing that he/she cares about or feels endearment for the recipient. Teasing that IS of an affectionate nature would be coded Affect 2. Words that describe Affect 2 include: Admiring, comforting, concerned, loving, proud, tender, warm.

3. Neutral: Affect 3 is coded whenever the person's affect is neutral. Affect 3 has an even-tempered quality. Matter of fact conversation is coded as Affect 3. In situations where the person's behavior contains a mixture of Affect 3 and any other affect category, the other affect category is coded. This is because Affect 3 is a category that provides relatively meager information about the interaction. Sometimes the person's voice will fluctuate slightly within the neutral range. It may seem as though the person almost moves out of the Affect 3 range, but never with enough strength to call it another affect code. In these cases, Affect 3 is coded. When, however, Affect 3 voice tone changes to another affect, or combined with other affect cues with enough strength to identify another affect category, the other affect category is coded. Words that describe Affect 3 include: Bland, flat, calm, reasonable, monotone.

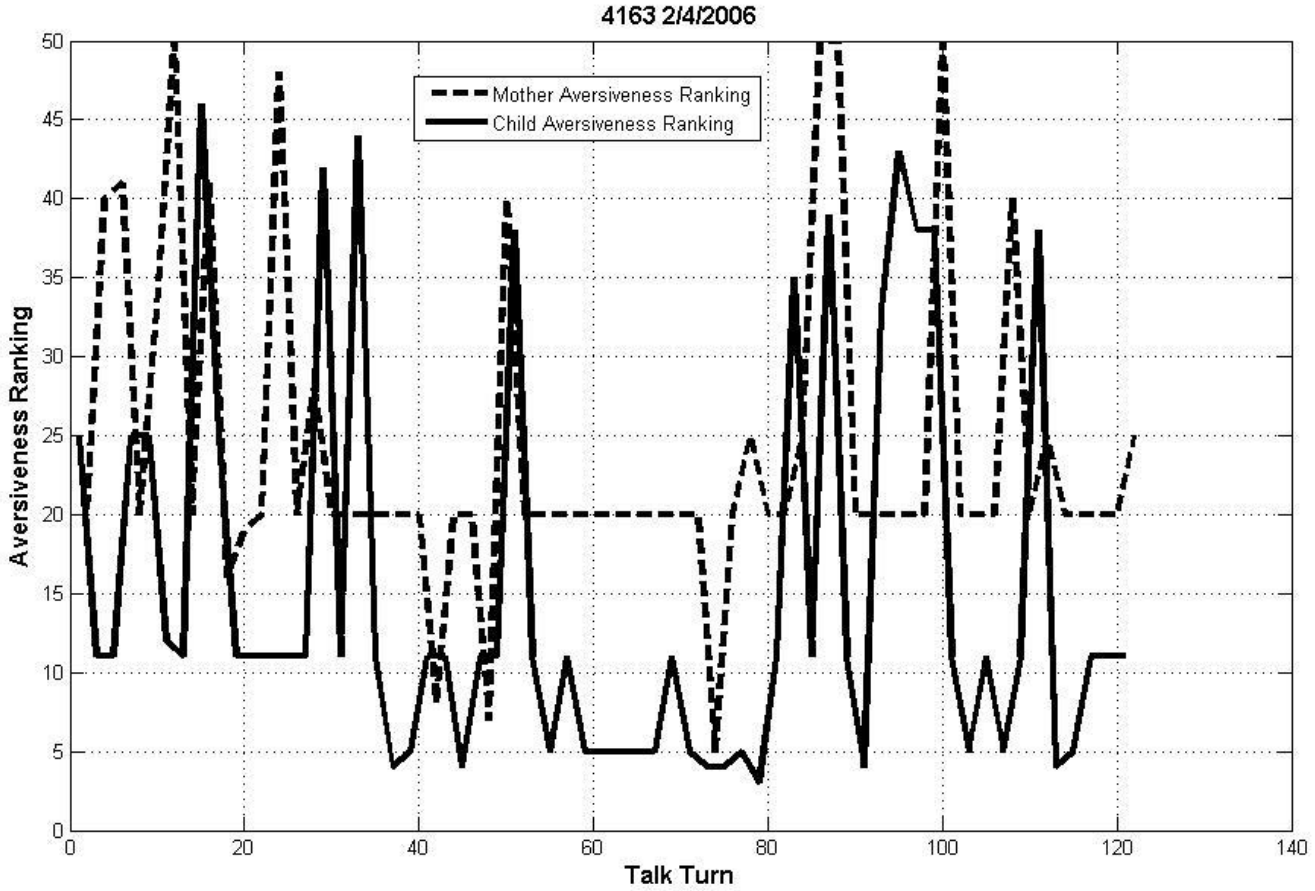
4. Distress: Affect 4 is coded when the subject displays nervousness, fear, embarrassment, anxiety, worry, sustained shock (e.g., the person's mouth is open and the eyes are wide or staring), or concern. Affect 4 is also coded when a personal speaks in a whiny, "poor me" tone of voice. Although whining is more common among children (especially 2-8 years old) than adults, adults can also have a whining affect while speaking. Affect 4 is also used to code expressions of physical pain. Words that describe Affect 4 include: Afraid, grimacing, nervous, startled, tense.

5. Aversive: Affect 5 is coded when the subject displays anger, displeasure, hostility, or harsh/cold detachment. It is also coded when the subject ridicules, mocks, or is sarcastic to another person. Light-hearted irony (often used when making jokes) that is clearly delivered with happy or caring affect should not be coded Affect 5. It is worth noting that while the intensity level of Affect 5 ranges from fairly mild (stern) to intense furious), all intensity levels could still be classified as aversive. Words that describe Affect 5 include: Abusive, cold, furious, mocking, rude, unkind.

6. Sad: Affect 6 is coded when the person's affect communicates sadness, dysphoria, despondence, or depression. Persons who communicate sad affect may simply appear

detached from the ongoing activity (e.g., they may seem apathetic or withdrawn), or they may show more overt signs of sadness or distress such as speaking in a low, slow tone, sighing, becoming tearful, and verbally expressing their sadness. Words that describe Affect 6 include: Blue, depressed, discouraged, gloomy, somber, tearful.

Appendix C: A Graph Depicting Mothers' and Children's Aversiveness Ranking Throughout an Interaction



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